

# NetworkWorld

**IP over ATM**

How to make  
it work now.  
Page 40.

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

## Digital mustering Unix clustering

*TruClusters packages to include high-speed server connector, Oracle parallel database.*

By Ben Heskett

New York

Those who say Unix is dead must not have talked to Digital Equipment Corp. lately. Despite Digital's huge endorsement of Windows NT, the company will give Unix a boost this week when it announces an improved

way to cluster Unix-based processors.

At a splashy event with Oracle Corp. on Wednesday, Digital will roll out a comprehensive Unix clustering package called TruClusters. The Alpha-based package includes a high-speed server connection card, an Oracle database bundle, and high-availability and high-performance clustering software.

TruClusters, which will ship later this spring, is more than just a product bundle; it represents a faster approach to clustering.

The major advance is having systems communicate more directly, which is accomplished through a PCI bus-based imple-

### Clustering conundrum



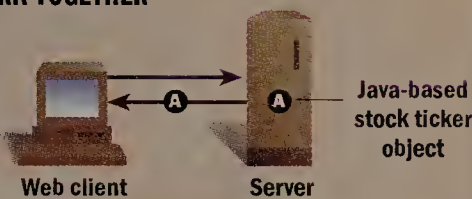
HP's Mellon and IBM's Nichols say their companies are exploring a variety of clustering options. **Page 56.**

mentation of Memory Channel Interconnect. The interconnect technology, licensed from Encore Computer Corp., is a wide-channel technology that lets a cluster of servers process a query through a high-speed memory interconnection, eliminating the need for queries to be routed through server I/O channels. The memory interconnect runs at 100M byte/sec, roughly two to four times faster than a typical SCSI connection.

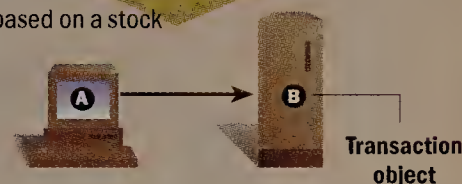
Oracle, meanwhile, will un-  
*See Digital, page 56*

### GETTING JAVA OBJECTS TO WORK TOGETHER

**1** In this example, a Web client makes an HTTP connection to download a Java-based stock ticker object from a server.



**2** The stock ticker object uses Java Remote Method Invocation (RMI) to activate another object, which could kick off a transaction based on a stock price. RMI classes and tools eliminate the tedious hand-coding now needed to create object-to-object Java links.



## Distributed Java is in the works

By John Cox

Mountain View, Calif.

Sun Microsystems, Inc. has been touting Java as a network programming language ideally suited for Internet applications — even though it's missing at least two key features needed to

make that a reality.

Now Sun is about to add one of those features: new code that lets Java objects on different computers easily work with each other, without additional middleware such as an object request broker (ORB). Down the road, Sun's Javasoft group will add the second capability: letting Java objects interact across a firewall. Firewalls control public Internet access to corporate backbones but also prevent client/server applications from working across broad portions of the net.

The addition of the Java Re-  
*See Java, page 56*

*In-Site*

## Utility energizes with Nways gear

By Michael Cooney

Toronto

Ontario Hydro is on its way to becoming a lean, mean, power-making machine, ready to take on all comers as the energy industry in Canada heads toward deregulation.

What's powering the company's increasingly competitive demeanor is a new backbone designed to consolidate existing LAN and SNA traffic while providing a platform for emerging applications.

The network — still evolving as part of a three-phase project — is anchored by a collection of IBM Nways switches that let Ontario Hydro run frame relay now and provide a migration path to Asynchronous Transfer Mode. The company's network, dubbed the  
*See In-Site, page 57*

Ontario Hydro's Peter Carayannakis likes IBM's Nways switches' "dynamic bandwidth allocations features."

JOHN MARQUAIL

## MCI unclogs 'Net pipe

*Major upgrade to Internet backbone to be completed today.*

By Joanie Wexler  
and Tim Greene

MCI Communications Corp. is about to take down a "No vacancy" sign it quietly hung on its Internet backbone in February.

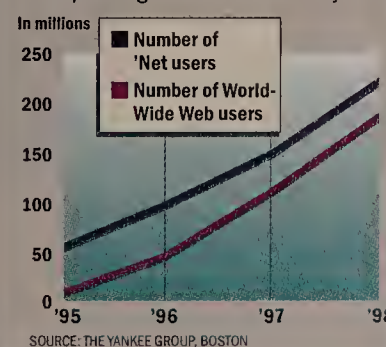
MCI confirmed last week that 'Net clogs have been forcing it to turn away customers wanting dedicated access at T-1 speeds or higher at a time when Internet fever is at an all-time high. But the carrier said a network upgrade slated for completion today will boost its Internet backbone capacity from 45M to 155M bit/sec, enabling it to relieve pent-up customer demand for 'Net access.

However, at least two Internet service providers (ISP) said they have been told by MCI they must wait until June for connections into the carrier's 'Net backbone.

Eric Anderson, president of

### GLOBAL INTERNET EXPLOSION

Carriers have their hands full supporting the expanding 'Net user community.



Anderson Computer Consulting in Marion, Ohio, said he wanted to buy a T-1 link to MCI's Internet service back in January so he could resell 28.8K bit/sec local dial-up 'Net access. Currently, there is no ISP offering local access in his area.

Anderson said he was initially told by MCI to expect a 45- to 60-  
*See MCI, page 56*

## Sun beams ATM traffic at higher speed

By Jodi Cohen

Mountain View, Calif.

Do you feel the need for speed? Sun Microsystems Computer Corp. certainly hopes so.

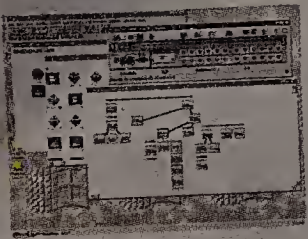
The company this week will announce its SunATM 622 adapter, providing four times the bandwidth of today's fastest Asynchronous Transfer Mode interface cards. The adapter is designed to provide high-speed  
*See Sun, page 57*

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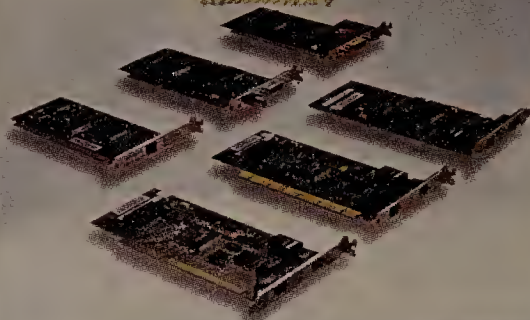
Access Network World Fusion using the number in yellow. See page 5 for details.



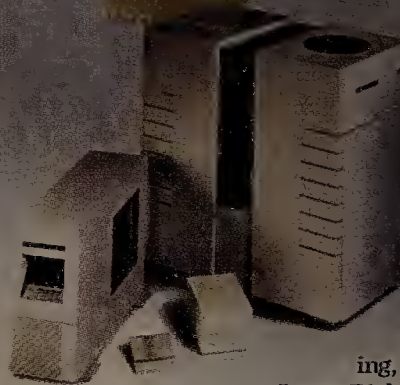
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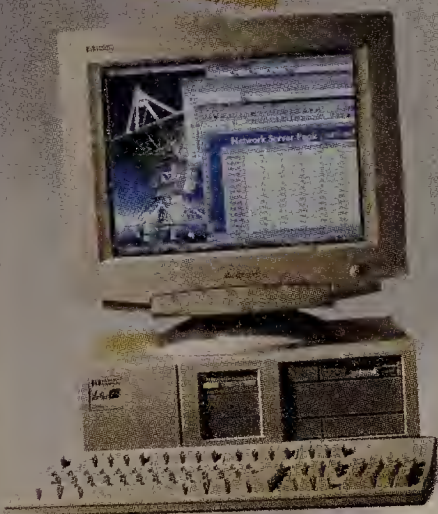
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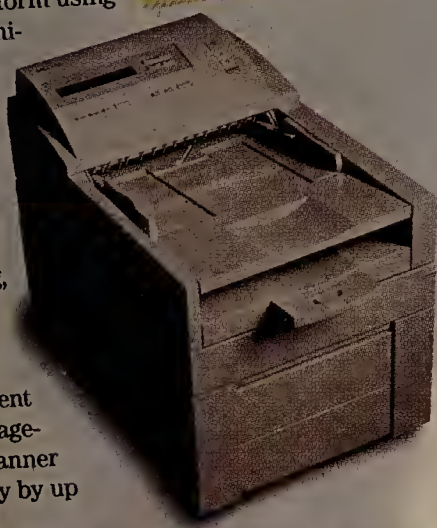
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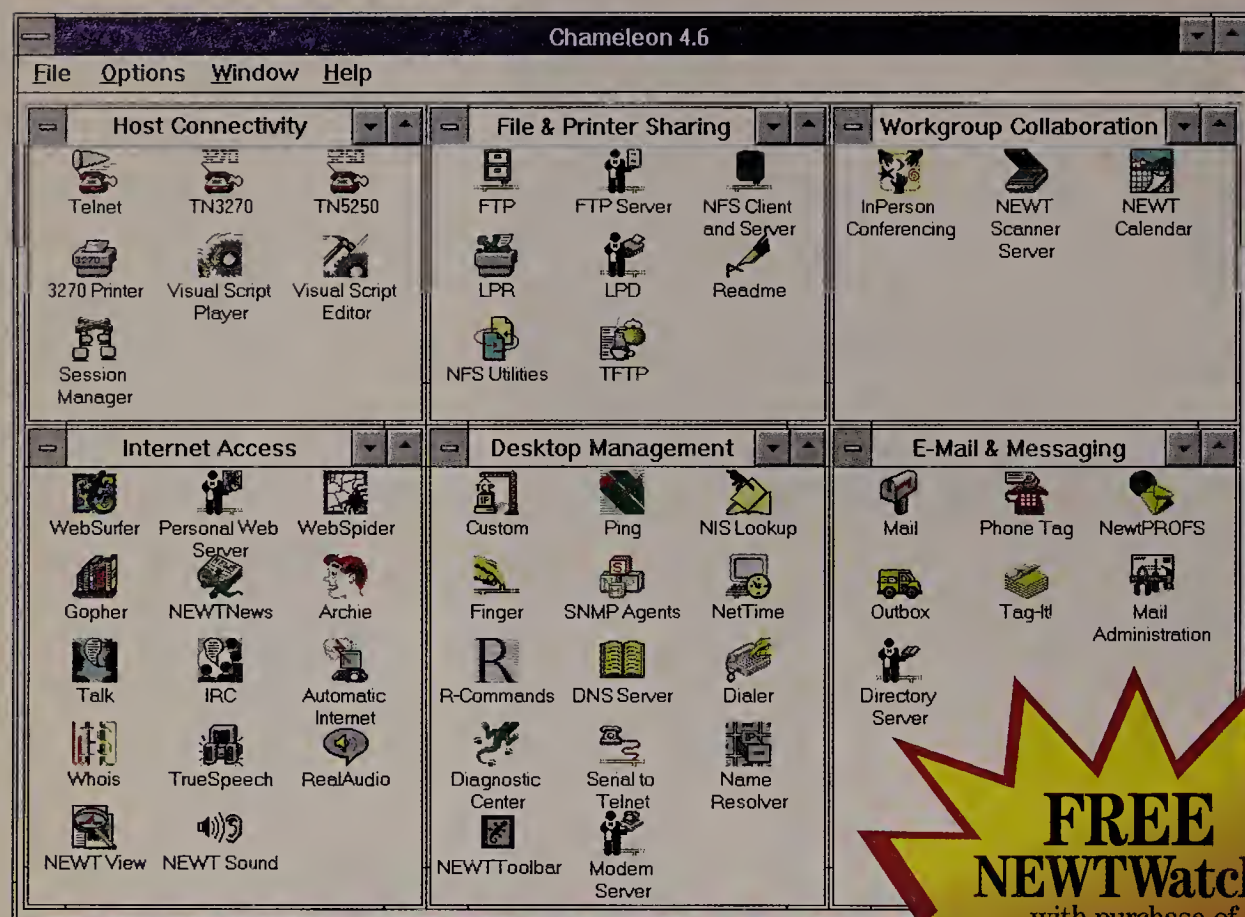
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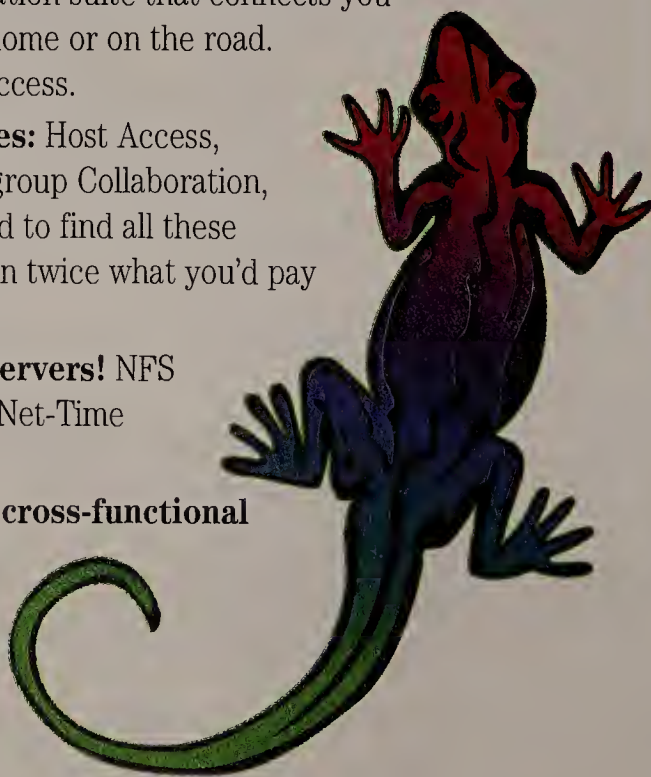
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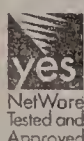
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# NetworkWorld Fusion

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## This Week



### News+

#### The Front Page:

- **Internet:** Is the 'Net becoming like Yogi Berra's restaurant: "It's so crowded nobody goes." We provide articles and links related to Internet congestion, from Sprint's decision not to route packets to certain addresses, to a daily Internet congestion "weather report."
- **622M bit/sec ATM:** Reports on tests of high-speed ATM cards at Sandia National Laboratories; see why such cards are essential to telemedicine.
- **SNA WANs:** How companies besides Ontario Hydro are moving their legacy nets to frame relay and ATM.

#### The Technical Sections:

- **SMP:** Articles on major hardware and software vendors' plans for server clustering and SMP, in Local Networks.
- **Client/server security:** As Novell seeks to make GroupWise secure enough for government work, see what other applications already have the federal seal of approval — and the sorts of testing they had to go through to get it, in Client/Server Applications.
- **Network Management:** Compare the network management strategies of different vendors via a series of articles, in WANs & Internetworking.



### Forum

- **Stumped by a networking problem?** Ask other users for help in Help Desk. Or if you know the answer, jump right in.

## this week's pick

If you do PowerBuilder programming, check out PowerBuilder Interactive (<http://www.pk.com/PowerBuilder>), which includes FAQs, mailing list archives, PowerBuilder news and even a live chat area for talking about application development.

### HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on First Visit and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an on-line registration form.



## CONFERENCE PICK

### HOT TOPIC

Read Kevin Tolly's column on page 38, then talk back on Network World Fusion (<http://www.nwfusion.com>).

Select Forum, Columnists then Tolly on Technology.

# NetworkWorld

An IDG Publication

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### TAKE TEN

In our April 29 issue, we'll celebrate a decade of publishing with a special look at the technologies, people and issues that will shape the networked world in the next 10 years.



### Special Network World Fusion Report:

Panelists (l. to r.) Barry Steinhardt, Ryan Dobson and Lee Gesmer participated in an on-line discussion about the 'Net and freedom of speech. Page 10.

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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.



## News briefs, April 15, 1996

### Rallying around Exchange

■ Later this year, you will be able to get the groupware, messaging and Internet connectivity of Microsoft Corp.'s Exchange Server as a network service instead of having to install it yourself. That is the goal of an alliance announced last week among MCI Communications Corp., Digital Equipment Corp. and Microsoft that builds on existing partnerships among the companies. MCI will offer an electronic mail and groupware service beginning this summer that integrates Exchange and MCI Mail, runs on Digital Alpha servers and is managed by Digital net management software. Also on deck is a managed intranet service built on Microsoft's Internet Information Server integrated into Windows NT.

### Can't keep those two apart

■ Microsoft Corp. last week submitted to the Internet Engineering Task Force a draft proposal for an encryption standard that combines the company's own technology with that of rival Netscape Communications Corp. The proposed standard, dubbed Secure Transport Layer Protocol, marries Netscape's Secure Sockets Layer 3.0, the dominant encryption technology, with features from Microsoft's Private Communications Technology 2.0.

### Quarterdeck makes 'Net moves

■ Quarterdeck Corp. will announce several aggressive 'Net initiatives at the Internet World show in San Jose, Calif., later this month. One is an Internet service provider (ISP) partners program, whereby ISPs can host Quarterdeck applications, such as Global Chat or its TalkShow 'Net collaboration software, on their networks. Quarterdeck will also launch TotalWeb, a \$99 package for Web authoring and serving. In addition, the company is creating the ability for users to build Web pages that can retrieve information off the 'Net and display it in an external database.

### Another SQL Server sequel

■ Microsoft Corp. this week will officially releases SQL Server 6.5 at DB Expo in San Francisco. Changes include a new feature, called Dynamic Locking, which lets SQL Server select the appropriate lock — on a row, page or table — for optimal speed and concurrency. Another new feature is the Distributed Transaction Monitor, which handles transactions among SQL Servers and connects to third-party transaction monitors. Prices start at \$999 per server and \$149 per client.



### Getting the DECmessageQ

■ Digital Equipment Corp. this week will announce Version 3.2 of its DECmessageQ middleware, which includes code that runs on MVS mainframes as well as a two-way link with IBM's rival MQ-Series middleware. Digital said the new software can process messages 40% faster than previous editions on multiprocessor Unix servers. Queued messaging products support reliable communications among networked applications.

### AT&T puts a CAP on it

■ AT&T last week announced agreements with five competitive access providers (CAP) that will give AT&T more options for local dedicated access to its long-haul network in 70 cities. AT&T spokesmen said the increased options could translate into cost savings for customers and that AT&T is negotiating with the CAPs on switched local access agreements, as well. The five CAPs involved are American Communications Services, Inc., Brooks Fiber Properties, Hyperion Telecommunications, IntelCom Group and Time Warner Communications.

### Bell Atlantic rings up 'Net access

■ Bell Atlantic Internet Solutions last week announced dedicated Internet access at speeds up to 34M bit/sec. Options range from frame relay or private lines at 56K to 1.5M bit/sec, to SMDS at 56K to 34M bit/sec. Pricing is about \$200 per month for 56K bit/sec service to \$775 per month for 1.176M bit/sec access. Users would also have to choose an Internet interexchange carrier.

# IBM delivers hardware for running distributed apps

By Michael Cooney  
Nashville

IBM this week will introduce a switch for parallel processors and a hardware platform that together are designed to help users deploy large, distributed applications.

The company, at its Technical Interchange conference here this week, will announce a new version of the switch used to link parallel processing supercomputers. The new Scalable Powerparallel (SP) Switch doubles the performance and reliability of the existing switch and reduces maintenance costs by 50%.

IBM will also announce the R/390, which combines in a stand-alone box the functions of the RISC System/6000 and AIX operating system with IBM's mainframe-on-a-board Personal/390 card and OpenEdition MVS operating system.

The SP Switch is the central component of IBM's SP parallel processing environment. Multiple switches can be used to strap together as many as 512 of IBM's RS/6000 SP2 processors to create a single system.

SP2s are positioned as low-cost alternatives for users looking to downsize mainframes or as distributed servers for the AIX environment, where they can run the more than 10,000 existing AIX-based commercial and scientific applications.

"As users build commercial and scientific transaction processing applications on larger scales, the need for a high-bandwidth, high-performing switch in the parallel environment is critical," said Bob Simko, executive director of the International Technology Group consultancy in Los Altos, Calif.

The new high-end SP Switch is powered by a 80-MHz IBM pro-

prietary 601 processor and supports 100M bit/sec links with as many as 128 parallel nodes — double the capacity of the previous SP Switch.

Typical TCP/IP Sockets applications can see a doubling in performance, as well, going from 35M to 77M bit/sec, according to IBM.

*IBM executives envision the R/390 in a number of roles, from an application development platform to a server in a TCP/IP network.*

"Because of the improvements, we have also been able to reduce the standard maintenance fees on a 16-port switch from \$845 a month to \$420," said Doris Benson, Powerparallel marketing manager.

An existing switch can be upgraded to the new switch but cannot coexist with it, Benson said. The switch will be available Sept. 27 for prices starting at \$100,000.

Robert Eudes, manager of the Molecular Sciences Computing Facility at the Pacific Northwest National Laboratory in Richland, Wash., said the switch will enable him to build large distrib-

uted applications without worrying about bottlenecks. The laboratory will be taking delivery of a massive, multimillion-dollar 472-node SP2 in June that will be linked via the new switch. It is the largest SP2 delivered so far, Benson said.

The R/390, powered by a 120-MHz PowerPC 604 processor coupled with an S/390 board, can run Unix and commercial mainframe applications simultaneously. It runs OpenEdition MVS 5.2.2, AIX 4.1, TCP/IP and X Window System.

"Users can use these processors to develop and run applications locally and communicate with a central host only when necessary, which will save telecom costs," Simko said. "They can also develop mainframe-based applications without having to spend money on additional mainframe memory."

IBM executives envision the R/390 in a number of roles, from an application development platform to a server in a TCP/IP network.

It can also serve to off-load the work of existing mainframes or help users migrate older S/370 applications to the S/390 world, according to the executives. It is a less expensive alternative to a true mainframe because it is priced between \$50,000 and \$90,000.

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Make an appointment with Dr. Internet on Network World Fusion. Select NetRef then Abend.



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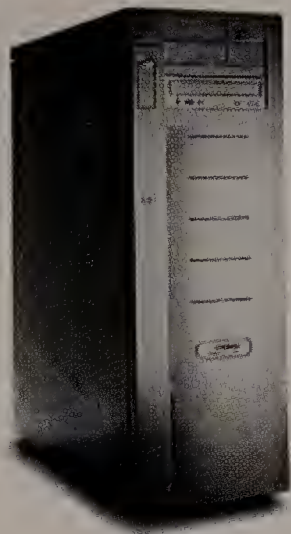
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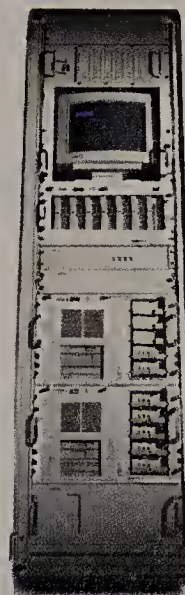


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# Ex-Oracle execs prep info access device

By Carol Sliwa  
and Barb Cole  
Belmont, Calif.

A small group of expatriates from Oracle Corp.'s new media division has set up a company that soon will unveil an information access product line with an end goal strikingly similar to one being pursued by their former company.

Officials at the start-up, called Diba, Inc., were tight-lipped with details about the new product line, which the company plans to introduce later this month. But sources said the company's thrust is providing new low-cost devices that will bring information to people who otherwise

wouldn't get it.

Joe Gillach, Diba's chief operating officer and formerly vice president of product marketing and management for Oracle's new media division, insisted that his company will not be competing with the \$500 network computer that Oracle is developing.

Indeed, one source said the device "doesn't even look like a computer."

Oracle and Diba apparently will take different approaches to achieve the same end result: disseminating information to the masses. With Diba's product line, the Internet will be only one of many ways that people can

gain access to the information, sources said.

Diba's World-Wide Web site, posting career opportunities, suggests that the products the company plans to offer will:

- Feature a development platform with a simple user interface, including touch screen and remote control capabilities.

- Cater to specific vertical markets.

- Support Java and RSA security.

- Be heavily graphical in the "Diba environment."

- Feature portable software.

A number of analysts have gotten the impression that Diba is trying to gain a foothold into the burgeoning Internet appliance market that companies such as Sony Corp., Sega Enterprises, Inc., Thompson Computer Electronics and ViewCall America are venturing into.

"It's an idea so good everyone had it," said Josh Bernoff, a For-

rester Research, Inc. analyst who recently issued a report on the market.

## Oracle experience

One of Diba's strengths in the new venture is its executive team, which has considerable industry experience in the area of new media technology.

Diba's president and chief executive officer Farzad Dibachi, who is chronicling the trials and tribulations of starting his new company in a journal for *Upside Magazine*, had run Oracle's new media division.

That division, which worked on the video server technology that was used in interactive television trials around the world, has recently been added to Oracle's core database product division.

While at Oracle, Dibachi hired his brother Farid's company, Wavetron Microsystems, to

help develop a prototype for what Oracle is now calling the network computer — a low-cost system for accessing the Web and Web-based applications.

Farid Dibachi, in his brother's words, built a million-dollar business designing Digital Signal Processor technology, a specialized computer chip that can perform speedy and complex operations on digitized waveforms. Farid will serve as Diba's chief technical officer and chairman.

Jumping from Oracle to join Diba, along with Farzad Dibachi and Gillach, was Mark Moore, formerly director of interactive services for Oracle's media server division.

Also, Stuart Reed, who had worked as senior director of Oracle's new media division, left videoconferencing systems maker Avistar Systems of Palo Alto, Calif., to join Diba. ■

## Is CDA protection or censorship? Fusion conference tackles freedom-of-speech issues

By Chris Nerney

Protecting children from pornographic or obscene material on the Internet is a job for parents, not the government.

That was the prevailing sentiment of Network World Fusion readers who participated in a recent on-line conference on the Communications Decency Act (CDA).

### SAFEGUARDING YOUR NETWORK AGAINST THE CDA

- ▶ Explore filtering technologies
- ▶ Understand the CDA's "good faith defense"
- ▶ Require end users to enter into agreements regarding transmission of material banned under the CDA
- ▶ Restrict access to the network by minors through verified credit cards and adult access codes
- ▶ Keep up on legal and technical developments

Readers' advocacy of parental responsibility, opposition to censorship and denunciations of the CDA echoed views of two of the conference's four panelists.

Panel members aggressively staked out positions on free speech, the prevalence of pornography on the Internet, definitions of "objection-

able" material and the constitutionality of the CDA.

Part of this federal law passed in February would impose criminal penalties on Internet service providers, individuals and employers that knowingly engage in the transmission over the Internet of "obscene" or "indecent" material that could be viewed by minors.

Panelists also offered advice to network managers about how to protect themselves from liability clauses in CDA, currently facing court challenges from the American Civil Liberties Union (ACLU) and other organizations.

The lawsuit brought by the ACLU and other groups has stalled enforcement of the CDA, with a decision not likely until late spring. Until then, the federal government has agreed not to prosecute or investigate under

the law. "The Communications Decency Act is not the appropriate solution" to the problem of pornography on the Internet, panelist Susan Getgood said.

Getgood, director of marketing for Microsystems Software, Inc., a Massachusetts company that sells Cyber Patrol, an Internet filter, argued that the global nature of cyberspace makes it "next to impossible" to regulate the 'Net.

Panelist Barry Steinhardt, associate director of the national ACLU, called the CDA unnecessary because "there are already laws on the books which criminalize the distribution of child pornography or the solicitation of a minor."

Like Getgood, Steinhardt prefers technological solutions and parental control to protect minors. "Parents who are concerned about the material which can be accessed by their children should use filtering software, and they need to set limits within their own homes," he said.

Many readers agreed. "I do not believe that it is the government's responsibility to control or monitor the Internet," said one reader, who went by "rbecker."

"Let's leave the control of what junior sees or doesn't see up to his/her parents," added reader Bill Martin.

Ryan Dobson of the Family Research Council, the only panelist supporting the CDA, argued that "the issue is not mere legality. The issue is responsibility."

Dobson maintained that society must protect children from abuse. "I have seen illegal images on the Internet," he said. "I have seen pictures of abused, mutilated women, and I have seen pictures of children in the midst of sexual abuse... For child pornography to exist, a child was violated and abused."

One reader who identified himself as "Daniel T."

accused Dobson of ignoring the "broader categories which actually are addressed by the CDA: the obscene, the indecent, the patently offensive."

"The CDA is not about images of abused and mutilated women and children," he said. "The language of the bill doesn't come close to being that focused..."

But Dobson received support from one reader who said, "Freedom of speech is one thing... but when abuse, violence and criminal activity are being advocated, enough is enough, Internet or not!"

The panelists outlined ways network managers could protect themselves from prosecution under the CDA.

Until the law is fully understood, network managers should "restrict access by minors" through mechanisms such as verified credit cards and adult access codes, said Boston attorney and panelist Lee Gesmer. He also said if minors do have access to a network, managers should not "knowingly permit your system to be used to transmit or store communica-

tions that depict or describe, in terms patently offensive as measured by contemporary community standards, sexual or excretory activities or organs."

Getgood, while predicting that the CDA will be ruled unconstitutional, said the new law provides network managers a "good-faith effort defense." Under this defense, she said, a service provider "won't be held liable for indecent content... provided it has made a good-faith effort to restrict this material from children."

Steinhardt advised network managers to stay abreast of "developments on both the legal and technical fronts."

Dobson urged network managers to "act like responsible citizens and do their best to uphold the law and protect the innocent." ■



CDA supporter Ryan Dobson from the Family Research Council faced opposition from ACLU's Barry Steinhardt, while attorney Lee Gesmer advised playing it safe.

Voice your opinion about free speech on the Internet in Network World Fusion's ongoing conference on the Communications Decency Act. Select Forum then the CDA conference icon.

Network World Fusion  
<http://www.nwfusion.com>



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decided the  
Internet is going  
to have  
the company

rolling in  
clover,

you might  
have  
a few  
questions.



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# “Can a customer pay by credit card without furnishing some hacker's condo in Malibu?”

## COMMERCE

There are security risks in all walks of life. But there is something about cybercrime – the idea of someone pressing a few buttons and making off with one's digital belongings – that is particularly frightening. And in fact, commerce on the Net will grow only as fast as confidence in the security of the Net grows.

Fortunately, our confidence has grown pretty fast over the last couple of years. IBM SecureWay includes a variety of services and products that, over time, will make exchanges across the Internet even more secure than nonelectronic transactions – everything from credit card transactions to super-distribution of copyrighted material to the transmission of confidential corporate data.



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Of course, your management needs to understand that an organization on the Internet is only as safe as its weakest link. With that in mind, we’ve developed powerful firewall, encryption and access control technology, not to mention one of the largest private secure business networks in the world – the IBM Global Network™.

So, in short, that hacker in Malibu is going to have to find a new way to make a living.

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## “Will a fancy port scanner algorithm make mincemeat of my firewall?”

### DEFENSE

On the one hand, the Internet gives your company the opportunity to open its doors to millions of potential customers, partners and contributors. On the other hand, there are all sorts of very clever people out there who would love to infiltrate your system, whether for mischief, for the challenge of it, or for plain old corporate theft.

Fortunately, we’ve got some hackers of our own. We call them “ethical hackers.” These are dedicated masters of the very latest techniques of sniffing, spoofing and cracking. And, working with the IBM Global Security Analysis Lab, they put this knowledge to use to develop better and better security countermeasures.

And, for our clients, the ethical hackers will use all their tricks and techniques to try to breach your network. This is one aspect of IBM’s Security Healthcheck – a series of powerful tests and preventive measures that lets us find weak spots and strengthen defenses before a break-in occurs.

But, because the world is a rough place and the worst can sometimes come to pass, IBM’s Emergency Response Service is on call 24 hours a day, seven days a week around the globe to close any breach in your network and repair the damage. The response team makes itself intimately familiar with your network and systems ahead of time, so that, in an emergency, they already know where to go and what to do.

We believe that the networked world can be a very safe place to do business. But that doesn’t happen by mistake, it happens by planning ahead.

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## Intranet management

# Intel upgrades LAN management tool with TCP/IP, WinNT support

By Kevin Fogarty

Intel Corp. is set to attack the Internet/intranet market with a new version of its LAN management product optimized for use on IP nets.

LANDesk Manager 2.5 includes the ability to inventory and remotely control systems across TCP/IP networks, not just the IPX nets earlier versions of the product addressed.

"The lack of IP support in the past was a real limitation," said Stan Schatt, an analyst at Computer Intelligence InfoCorp.

A free upgrade due this spring will add remote control of Windows NT Workstations and Servers, an enhancement that will vastly expand its potential impact considering the growing base of NT Workstations and

As a first step, the company promised an NT-based agent that could feed management data to a NetWare-based repository and a cut-down version of the LANDesk suite that would run natively on NT. A later version was to put the entire suite on NT.

LANDesk Manager 2.5 will also include a Desktop Management Interface (DMI) session layer, which can receive DMI data from devices on the network and display it on a LANDesk console.

The DMI link is important, analysts said, because it will be one of the first session-level DMI implementations. The Desktop Management Task Force has not concluded standards-setting procedures for a management layer to receive DMI information, so Intel's model should provide significant influence on that development, analysts said.

The release should be available by the end of this month starting at \$750, sources said.

Staff Writer Ben Heskett contributed to this story.

## LANDesk Manager 2.5 pricing

License	Price
5 nodes	\$750 (\$150 per node)
6-999 nodes	\$62.50 per node
1,000+ nodes	\$50 per node

Servers, Schatt said. "Even Novell is moving toward providing closer support for NT, so it behooves Intel to move in that direction, as well."

LANDesk Manager 2.5 also includes the ability to remotely control and manage OS/2 and Windows 95 machines, features that had been lacking in the NetWare-centric product, according to sources briefed by Intel.

The ability to remotely control NT and OS/2 systems is a huge boost for net managers and help desk personnel, who will be able to use the feature to troubleshoot systems in remote offices, sources said.

Intel is moving its management product away from its NetWare roots and toward a future dominated by Internet technologies and increasingly populated with NT, analysts said.

The new version is limited in its NT support, however, because its administration and management information repository still resides exclusively on NetWare. Observers expect future versions to run natively on NT, but Intel has not confirmed plans to do so. The company last October did announce a two-stage process of integrating NT support into LANDesk Manager.

# Oracle to Web-enable client/server suite

By Ellen Messmer

Redwood Shores, Calif.

Oracle Corp. will Web-enable some of the applications in its Enterprise Resource Planning client/server suite, company sources said.

End users currently need proprietary client software to access or enter data into Enterprise Resource Planning (ERP) applications that reside on an Oracle database.

By making those applications accessible via any Java-enabled browser, corporations can let their customers, suppliers and a larger number of employees use ERP.

ERP is a set of applications for human resources, finance and manufacturing — directly competing with those from SAP America, Inc.

To Web-enable the ERP applications, Oracle will announce three new software products; Web Employer, Web Customer and Web Supplier. Expected to each cost about \$25,000, these programs run as Java applets on Oracle's Web server. The ERP applets on the Web server will be able to access the ERP database using SQL.

They will also be able to generate HTML Web pages on the fly for transmission over corporate intranets or the Internet.

"Suppliers in manufacturing will be able to look at the status of

their order," one source said. "Your customers can see what's been received and shipped."

Oracle users said adapting ERP to the Web might help them hold down costs and more easily manage distributed applications.

"A big problem is keeping applications current in a client/server environment," said Peter Palmisario, chief information officer at Cambridge, Mass.-based environmental consulting firm Camp Dresser & McKee, Inc.

"With Java, you won't have to have client software resident on the desktop," he said.

## Tools Webfied

Also, Oracle this week will unveil new versions of its application development tools, with fea-

tures for building Internet/Web applications. The Designer 2000 modeling tools will now generate — from existing application models — the necessary code to let Web browsers view information on Oracle databases. Later this year, the tool set will also generate Java applets from these models.

By year-end, Oracle's PowerObjects — the company's client/server workgroup tool set — will be able to integrate with the other repository-based tools.

Designer 2000 will be able to generate PowerObjects components from its stored application models.

This summer, PowerObjects will also incorporate URLs and run inside Netscape Communications Corp.'s Navigator browser. ■

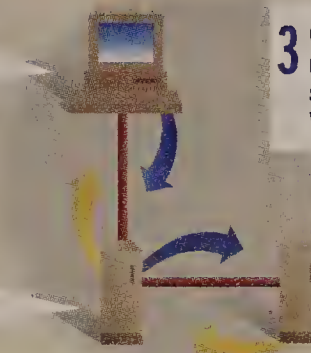
## Oracle adapts Enterprise Resource Planning to the Web

Oracle seeks to make ERP applications accessible via Java-enabled browsers.

1 Client with Java-enabled browser requests information.

2 Oracle Web server passes request along to ERP.

3 Oracle database running ERP ships data off to Web server.



# VAN providers ready Exchange services

By Tim Greene

Value-added network providers can't wait to get their hooks into Microsoft Corp.'s Exchange, the long-awaited client/server electronic messaging software.

Infonet Services Corp. has the most definite plans, with a scheduled June release of Notice Server, a round-the-clock managed service under which Infonet lets customers lease access to Exchange servers within its network.

Following suit, WorldCom is hammering out the licensing arrangement it needs to offer an on-line Exchange service. WorldCom already runs an international managed network of Lotus Development Corp. Notes servers.

In addition, CompuServe, Inc. will decide within four weeks whether to come up with its own

version of a public Exchange-based network service, according to Jim Freeze, CompuServe's director of application-based network services. The company first wants to verify the stability of the messaging software and check that it can work with other

messaging systems.

The fact that all of these carriers are planning or considering the rollout of an Exchange-based service indicates they have not been spooked by AT&T's recent decision to fold its ambitious Network Notes service (NW, March 4, page 1). Both CompuServe and WorldCom said demand is strong for their Notes services.

## Infonet backs Exchange

After Microsoft released Exchange two weeks ago (NW, April 8, page 12), Infonet reacted quickly by announcing Notice Server, which will let customers access an Exchange server from anywhere on Infonet's 55-country network.

Infonet already offers on-line cc:Mail and Microsoft Mail managed services, and many users of those services have said they want to switch to Exchange, according to Alex Rassey, Infonet's

general manager of Global Workplace Services. Exchange proved stable enough for Infonet to dive right into offering a service, he said.

For customers that want to add Exchange to some sites but keep existing messaging platforms at other locations, Infonet will integrate cc:Mail and Microsoft Mail with Exchange via X.400 and Simple Mail Transfer Protocol backbone technology.

Dan Bakel, network specialist for The Trane Co., International Group, said his group is beta-testing Infonet's new Exchange service, hoping to see faster response times for messaging among its worldwide traveling sales force.

The group plans to use the test as a way to learn about Exchange, with the intent of setting up its own servers later. But there's a chance the company will wind up going with the Notice Server service if the benefits of outsourcing prove overwhelmingly favorable, Bakel said.

©Infonet: (310) 335-2600.

## Manage my Exchange

This is preliminary maximum monthly pricing for Infonet's managed Microsoft Exchange server service. Volume discounts are available.

- ▶ \$30 per remote PC client
- ▶ \$500 per server connected to an Infonet server
- ▶ \$150 per server indirectly connected to an Infonet server
- ▶ \$2,500 per month for a server administered by Infonet and dedicated to a single customer
- ▶ Plus the cost of the underlying network service, either IP, frame relay, X.25 or asynchronous



## Switched nets

# Cisco well along on VLAN road map

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc. last week said it will deliver extensions to its VLAN arsenal over the next two years, culminating in security and application management enhancements by 1998.

The additions include a protocol for extending virtual LAN frames across different LAN media, dynamic VLAN assignment and policy-based administration (NW, Oct. 9, 1995, page 17). The extensions are part of a five-phase VLAN road map Cisco has quietly been adhering to since 1994.

A key component for interconnecting VLANs, though, will apparently miss its initial delivery date. Cisco will now deliver a routing module for its Catalyst 5000 switch early next year instead of this year, said Jayshree

Ullal, director of marketing for Cisco's Workgroup business unit.

The delay is due to the time it takes to ensure that the routing module can work with existing Catalyst 5000 switching modules, Ullal said.

Expected to ship soon, meanwhile, is a so-called virtual trunk protocol (VTP) that allows users to extend VLANs across different LAN media.

VTP is designed to map one VLAN frame-tagging protocol to another so users can configure VLANs with a variety of Cisco switches and LAN media.

Cisco also is working with network interface card (NIC) suppliers to extend its VLAN protocols to servers. The benefit would be to support multiple VLANs through a single server interface instead of through

multiple interfaces.

In March, Cisco and Intel Corp. announced that Intel will add Cisco's Interswitch Link VLAN protocol to its Fast Ethernet server cards. And last week, NIC vendor Xpoint Technologies, Inc. said it will do the same.

## Dynamic assignment

Also on the docket for this year and next are enhancements to Cisco's management software to enable dynamic VLAN assignment. Currently, users have to statically assign specific switch ports to specific VLANs. Dynamic assignment lets switches automatically delegate ports to particular VLANs by working with a VLAN configuration server.

"One of the things that's killing us on campus is the fact that

## Cisco's VLAN calendar

Phase	Capabilities	Benefits
I 1994	Address lookup and MAC address filtering	Performance management
II 1995-1997	Packet tagging and GUI-based management	Bandwidth and change management
III 1996-1997	MultiLAN mapping protocol and server integration	Campuswide VLANs
IV 1996-1997	Dynamic VLANs, as well as automated membership and administration	Automated change management
V 1997-1998	Policy-driven multiprotocol VLANs	Security and application management

we have so many people with notebook computers," said Cisco user Bill Meyers, network specialist at Oregon State University in Corvallis. "When they move from one network to another, the configuration's not there to provide them with [address assignment]."

## Management makeover

Lastly, Cisco will enhance VLAN security and application management by adding policy-based multiprotocol administra-

tion to its Cisco IOS software over the next two years.

This will enable users to predefine policies by which packets are forwarded to or prohibited from particular VLAN groups, and applications are guaranteed a specific class of transmission service.

For example, network administrators will be able to define policies, which will be enforced by the VLAN switches, for user access rights and application bandwidth requirements. ■

# Gradient's WebCrusader line provides secure Internet apps

By John Cox

Marlborough, Mass.

Gradient Technologies, Inc. this week will unveil its WebCrusader product line, a set of client and

server programs for creating secure Internet and World-Wide Web applications.

WebCrusader is based on the application services provided by

the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE). Using the services, WebCrusader programs can give Web browsers access to corporate data and information systems, including third-party client/server applications.

WebCrusader consists of several tools:

■ Connect Client, which runs with the Web browser and includes client DCE software. Connect Client creates transparent access to distributed services

such as security.

■ Connect Server, which runs on the Web server to control access to the server and to back-end corporate data and applications via distributed security services.

■ Secure AppEngine, which translates an HTML request initiated by a Web browser into an authenticated, high-performance connection that lets the original request execute a back-end application.

■ Security Authority, which

applies controls through public-key technology to users accessing corporate systems via the 'Net.

■ Commander, a graphical interface for controlling security permissions and access controls, for example.

All of the tools, except Commander, will be available within the next 45 days. Commander's price and release date have not been set. Prices start at \$35 for Connect Client; the other tools cost \$1,500 each.

©Gradient: (508) 624-9600.

# Raptor gives 3-D 'Net view

By Ellen Messmer

Waltham, Mass.

Firewall vendor Raptor Systems, Inc. last week unveiled a 3-D security monitor that shows corporate intranet and Internet activity like an ongoing action movie.

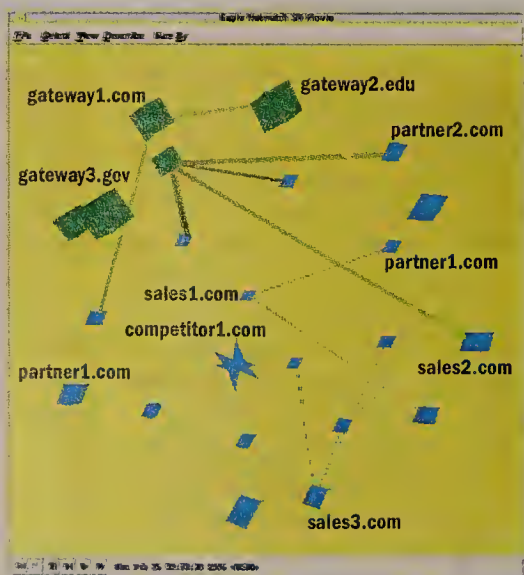
The monitor, called Eagle NetWatch, works by polling activity logs from Raptor's Eagle security products every two minutes. It displays information about the end user's IP address and Internet application usage as icons and colors that change as the user's network activity varies.

"It's constantly running a 3-D visualization of network attacks, denials, FTP traffic and other applications," said Mark Taylor, Raptor product marketing manager. Hosts and clients are depicted graphically, and images can be rotated three-dimensionally.

Eagle NetWatch records the history of activity so managers can make queries about network usage. "You can look at it over time to identify trends in your activity," Taylor said.

Eagle NetWatch costs \$6,995 and is shipping now for Solaris. Support for HP-UX and Windows NT is planned.

©Raptor: (617) 487-7700.



Getting the bird's-eye view of security.

# GEIS, Netscape team to drive EDI on the 'Net

By Ellen Messmer

and Carol Sliwa

Mountain View, Calif.

Value-added network veteran GE Information Services and Netscape Communications Corp. last week said they will join forces to create EDI products that work over the Internet and VANs.

Decades old, electronic data interchange originated with mainframe applications for sharing critical purchasing and shipment information between trading partners over proprietary VANs and private lines. Today, EDI transactions are conducted much the same way.

But through Actra Business Systems, a new company established by GEIS and Netscape, customers will gain access to Web-enabled EDI products that could foster more electronic commerce over the Internet.

Bruce Chovnick, vice president of Internet services and emerging technologies at GEIS, said the company and its new partner may develop a network gateway for tying legacy EDI systems to the Internet. However, actual products are at least a year away.

Standards-based EDI software often requires fine-tuning to meet trading partners' specific needs. Recognizing this, Actra will likely create HTML-based electronic forms that could be customized using the Netscape Navigator browser, according to Jim Sha, Netscape senior vice president.

"Java will play an important role in the EDI forms arena," Sha said. "Java can provide the

intelligence on the client side and help address the portability issue."

Actra will work with the Internet Engineering Task Force to help establish standards for conducting EDI on the Internet. And Actra intends to create products that work over many of the VANs, not just the GEIS network, Chovnick said.

Separately, Netscape last week also forged alliances with Bell Atlantic Corp. and Autodesk, Inc. Bell Atlantic will provide Netscape Internet software to residential and business customers. The Autodesk-Netscape partnership will help engineers view, publish and manage design data over the Internet. ■

*"Java can provide the intelligence on the client side and help address the portability issue,"*  
Jim Sha said.



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In which ways are you personally involved in your company's purchase of networking products? (check one)

- a. ☐ Determine need    c. ☐ Authorize purchaser    e. ☐ Evaluate features/brands  
b. ☐ Place order    d. ☐ Specify/recommend supplier/vendor    f. ☐ None of the above

How many nodes are on your company's network?

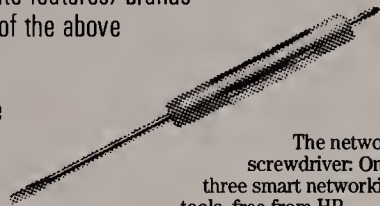
- g. ☐ 1-20    h. ☐ 21-50    i. ☐ 51-100    j. ☐ 101-500    k. ☐ 501 or more

Which of the HP networking products does your organization currently use?  
(check all that apply)

- l. ☐ Internal Print Server (e.g., Jet Direct)    p. ☐ External Print Servers (e.g., Jet Direct EX)  
m. ☐ Routers (e.g., Router 650)    q. ☐ PC LAN Adapters  
n. ☐ Hubs (e.g., EtherTwist, AdvancedStack)    r. ☐ Switches (e.g., HP LAN Switch)  
o. ☐ Servers (e.g., HP NetServers)    s. ☐ Network Management Software (e.g., HP OpenView)    t. ☐ None

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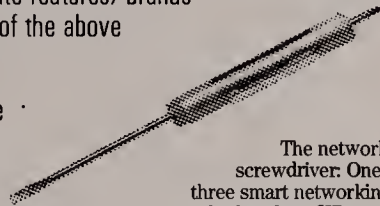
- g. ☐ 1-20    h. ☐ 21-50    i. ☐ 51-100    j. ☐ 101-500    k. ☐ 501 or more

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n. ☐ Hubs (e.g., EtherTwist, AdvancedStack)    r. ☐ Switches (e.g., HP LAN Switch)  
o. ☐ Servers (e.g., HP NetServers)    s. ☐ Network Management Software (e.g., HP OpenView)    t. ☐ None

\* This offer is only valid for qualified respondents in the U.S. and Canada until 7/15/96, or while supplies last.

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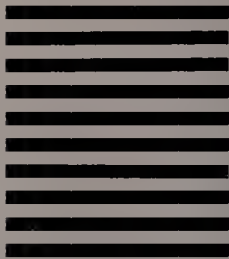


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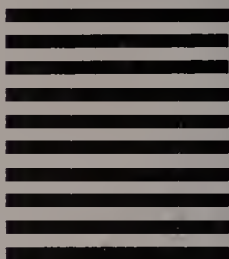
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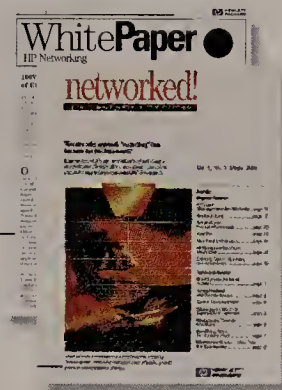
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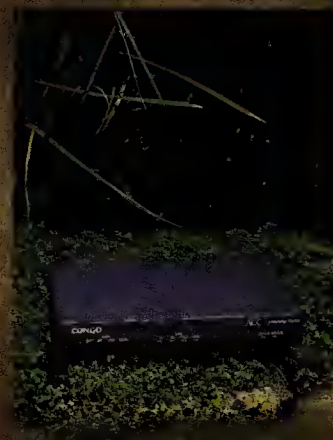
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# WANs & Internetworking

**Covering:** Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

## Briefs

■ **IBM and Novell, Inc.** last week announced a version of NetWare for SAA for the Application System/400 that lets users tie as many as 200 NetWare users to the mid-range platform.

The **NetWare for SAA: AS/400 Edition** gateway runs as a stand-alone package on Intel Corp.-based PCs and supports standard SNA sessions such as print services and LU 6.2 to the AS/400.

The package is available in five-, 10-, 25- and 100-user versions with prices ranging from \$995 to \$7,695.

Novell: (800) 638-9273.

■ **Eicon Technology, Inc.** last week unveiled a PC Card that combines ISDN and modem capabilities for remote access applications.

The Diva Terminal/Adapter (T/A) works with both PC and Macintosh platforms. It allows laptop users to connect to the Internet or to corporate backbones at speeds up to 128K bit/sec.

Diva T/A supports the Hayes AT command set with ISDN extensions, enabling users to install the device with familiar modem procedures.

Designed as an alternative to V.34 modems, Diva T/A costs \$495 and will be available in May with either an S/T or U interface.

Eicon: (214) 239-3270.

■ **Proteon, Inc.** has expanded its line of GlobeTrotter access routers with asynchronous and ISDN options.

The company unveiled six new GlobeTrotter models priced from \$795 to \$1,195. They include GlobeTrotter 70-U, with an integrated NT-1 interface; the 70-S/T, featuring an ISDN S/T interface; and the 72-U and 72-S/T, with IP, IPX and AppleTalk bridging.

Also, the GlobeTrotter 60 now features asynchronous dial-up and synchronous frame relay, while GlobeTrotter 62 sports the same with IPX, AppleTalk and bridging capabilities.

All models are currently available except for the 72-U and 72-S/T, which will be available in June.

Proteon: (508) 898-2800.

## Bull chases down U.S. net management foes

By Jim Duffy  
Billerica, Mass.

In an effort to build mind share in the U.S. market, Bull HN Information Systems, Inc. has expanded the capabilities of its ISM/OpenMaster management platform to embrace Windows NT and other systems.

ISM/OpenMaster is an enterprise-wide network and systems management platform—a competitor to Hewlett-Packard Co.'s market-leading OpenView, IBM's SystemView and Tivoli offerings, and Computer Associates International, Inc.'s CA-Unicenter product.

ISM/OpenMaster is used by 500 organizations worldwide but

has only been offered in the U.S. since last year.

As a result, ISM/OpenMaster has its work cut out in carving a domestic niche. However, continual praise from industry pundits may help buoy Bull's prospects.

### Ain't no Bull

#### Additions to Bull's ISM/OpenMaster platform:

- ▶ Enterprise asset management
- ▶ Remote control of PCs and Unix servers
- ▶ Management of workgroups with Windows 95 and Windows NT clients, and IBM AIX servers

"They give you the object-oriented framework and a scalable platform, and they retool all the applications you want so they can run in your environment," said Tim Wilson, senior consultant at Decisys, Inc. in Sterling, Va. "It's more of a turnkey management solution."

Support for Windows NT couldn't hurt either. The NT management capabilities now included in ISM/OpenMaster allow users to monitor and configure NT systems from an ISM console, including measuring performance, gathering inventory and asset data, and distributing software.

ISM/OpenMaster is also interoperable with Microsoft Corp.'s Systems Management Server software, an inventory and software distribution tool that runs on NT.

In addition to Windows NT, ISM/OpenMaster can monitor

and configure Windows 95 clients, IBM AIX servers and Novell, Inc. NetWare workgroups.

These capabilities are available now as part of ISM's PC OperationMaster software module. Pricing starts at \$2,500.

Other enhancements to the Bull management system include enterprise asset management and remote PC control.

### Bull not sitting

Through a partnership with PS'SOFT S.A., Bull will integrate that company's Qualiparc asset management application with ISM.

Qualiparc helps track the entire life cycle of information technology assets so users can gauge the productivity, reliability and service quality of their information infrastructure.

Bull also is working with UniPress Software, Inc. to add UniPress' CoSession PC2X software to ISM's application arsenal.

CoSession PC2X will allow ISM users to remotely configure and diagnose problems on Windows 3.X, Windows 95 and Windows for Workgroups PCs.

The Qualiparc application is

## General DataComm ready to make switch?

While short on details, vendor says new offering fits into revised ATM architecture.

By Tim Greene

Middlebury, Conn.

General DataComm, Inc. has fine-tuned its vision of the emerging Asynchronous Transfer Mode market. It is now betting that users want many relatively low-speed ATM circuits rather than a single big pipe to carry a mix of voice, video and data traffic.

### General DataComm's new vision

#### GDC sees five ATM switch categories:

- ▶ Workgroup switch (GDC offers no product in this category)
- ▶ Enterprise concentrator (APEX MAC, APEX MAC-1, DV2)
- ▶ Edge switch (APEX NPX)
- ▶ Service provider edge concentrator (Strobos)
- ▶ Core switch (GDC offers no product in this category)

In introducing its new vision, the company has started hinting about Strobos, a backbone ATM switch that would trunk traffic from its line of smaller switches.

While refusing to detail specifications of the switch, the company described it as offering

high-speed cell switching and high port densities with port speeds of OC-3 (155M bit/sec).

The switch is scheduled to be demonstrated at the NetWorld+ Interop show in Atlanta this fall.

"My guess is GDC is architecting a more realistic core switch based on the assumption that ATM connections are going to be much smaller in terms of bandwidth than had been previously estimated," according to Thomas Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

Initial models for how ATM demand would evolve relied on the assumption that users would clamor for high-speed ATM access, meaning ATM networks would have layers of switches, each layer concentrating traffic from the lower layers, Nolle said.

The new model predicts fewer layers of switches, meaning more edge switches and fewer core switches in ATM networks. So those core switches will need high port density to concentrate lower level switches.

Under that model, the switch matrix will need to support many smaller permanent virtual circuits rather than a relatively smaller number of larger PVCs,

Nolle said. It is a daring move in some ways, he said, because it is not clear that there will be a widespread need for such a switch for several years, even assuming GDC's new ATM network model is accurate. "Is that a valid view? That's an issue in and of itself," Nolle said.

The revised vision and introduction of the new switch can also be regarded as an assurance to users that GDC will have a next-generation, high-capacity ATM offering when they might need it.

According to Keith Mumford, GDC's ATM product manager, Strobos is a cell-only switch that collapses traffic from ATM switches at user sites. In a carrier network, it would be used as a concentrator switch for a core ATM switch.

GDC is also beta-testing a frame relay/frame User-Network Interface module for its APEX MAC, APEX MAC-1 and DV2 switches and concentrators. It will ship by year-end.

Earlier this month, GDC announced that Ericsson Business Networks AB would private-label APEX switches for sale in its network integration business.

©GDC: (203) 574-1118.

currently available, with pricing starting at \$8,000. A fully ISM-integrated CoSession PC2X application will be available later this quarter at prices ranging from \$125 to \$595.

Though Bull is making strides extending its ISM technology across the enterprise, its challenge will be to convince users to adopt it.

"The object-oriented framework is proprietary," Decisys' Wilson said. "In order to integrate your applications with the Bull platform, you have to get Bull to do the integration."

©Bull: (508) 294-6000.

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# INTERNETWORKING MONITOR

Scott Bradner



## Certainly unpredictable

**W**hile I was in Las Vegas pitying the magicians, jugglers and pool hustlers trying to get people into the booths at NetWorld+Interop 96 (and lamenting the lack of technical prowess that the use of such devices demonstrates), the mail brought an interesting new book. The National

Research Council's Computer Science and Telecommunications Board has published another volume in its excellent series on the National Information Infrastructure (NII) called *The Unpredictable Certainty: Information Infrastructure through 2000* (ISBN 0-309-05432-X).

The book is one of the results of a work-

shop and forum held in early 1995 that were guided in part by a letter from Vice President Al Gore, in which he said, "We would like to see an NII that allows individuals to be producers as well as consumers of information, that enables many to many communication and that provides a general-purpose infrastructure capable of supporting a wide range of services."

This is a somewhat different picture than some of the cable and telephone companies seem to have. They seem to think that they will be the font of all information. Since the main power of the Internet (and, come to think of it, the telephone) has been its support of many to many, it is more than passing strange that these companies don't yet get it.

The authors of this book believe, as I do, that the Internet of today will evolve into the information infrastructure of the future, rather than be replaced by it as many observers once thought. But even assuming that the future will evolve from the present, it is not possible to predict much about what it will look like.

It is certain that there will be a global, not national, information infrastructure in our future. It will not be the Internet, in the sense that the Internet is a differentiable data service. Instead, the data service of tomorrow will be an indistinguishable part of the whole.

Some have called the Internet (by which they mean generalized data connectivity) second only to the printing press in its potential impact on the societies of this earth. The printing press brought information and ideas straight to the hands of the general population. Before then, information was a sacred commodity and few possessed the skills and resources required to be a part of the knowledgeable elite.

The printing press broadened this elite until it was not so elite at all. The general population could participate, at least in the receiving part.

The sending part has been more restrictive. While publishing the printed word is now far more dispersed than it was in the days of medieval monks, there is still a high entry fee.

This is a factor that is changing with the Internet. There is a far lower cost of entry on the Internet than with a traditional publication.

We are in a time of significant stress about this emerging communications ability. Printing presses are control points that governments and others use to affect what is published. These control points are absent in the many-to-many world of the Internet and will be absent in whatever the Internet grows up to be.

The Internet of today is not a canvas upon which we can easily draw maps of the roads we will be traveling; it's just communication, but communication is the stuff from which the future will be built.

*Disclaimer: Harvard has been interested in communication for quite a while, as evidenced by the Gutenberg Bible in the library (despite what our Cambridge neighbors would have you believe), but the above meanderings are mine.*

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at [sob@harvard.edu](mailto:sob@harvard.edu).

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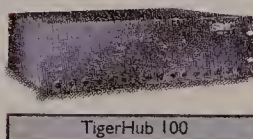
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EtherPower 10/100 provides top-quality features. Like super-fast installation (30 seconds or less).

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\*For a complete report, visit the LANQuest Labs Web site at <http://www.lanquest.com>



# Carrier Services

**Covering:** Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

## Briefs

■ **Seattle-based carrier Midcom Communications, Inc.** reported a 1995 loss of **\$33.4 million** despite an acquisition-fueled 82% increase in revenues to \$203.6 million.

Among the reasons for the loss: billing delays, a long-distance joint venture in Russia and a switching equipment write-off as it upgrades to Lucent Technologies, Inc.'s 5ESS central office switches.

■ **Sprint Corp.** has redesigned its World-Wide Web site (<http://www.sprint.com>) to make it easier to navigate and more interactive. Among the new functions: From the Web site, users can send messages to any **Sprint paging** customer in the U.S.

■ **MasterCard International, Inc.** has signed a multi-million-dollar deal with AT&T Solutions, the carrier's outsourcing arm, for the design, construction and management support of a **30-country transaction processing network** that will run MasterCard's financial services business.

■ **AT&T** has licensed **Lycos, Inc.** Internet navigational tools for use in AT&T's WorldNet Internet access service, Lycos said last week. The Lycos services are scheduled to be integrated into WorldNet this month.

■ In other WorldNet news, **AT&T** announced that its users will be able to get to **CompuServe, Inc.'s** Information Service. Under the plan, AT&T will make CompuServe's access software available to WorldNet customers. AT&T also will offer the CompuServe service at a discount but has yet to disclose pricing.

AT&T: (800) 967-5363 or <http://www.att.com/worldnet>.

■ The 10-company **Virginia Alliance, L.C. consortium** said it will acquire a portion of PCS PrimeCo. L.P.'s 30-MHz **personal communications services** radio spectrum license for \$16 million. The sale is subject to approval of a partitioning plan to be filed with the Federal Communications Commission.

## MCI joins high-speed frame club

*Increments in port speeds set at finer intervals than LDDS WorldCom.*

By David Rohde  
Washington, D.C.

MCI Communications Corp. is joining the move toward high-speed frame relay, pushing the upper port speed on its HyperStream service beyond T-1 for the first time.

The feature, announced at NetWorld+Interop 96, will give users the ability to bring hundreds more permanent virtual circuits (PVC) into a single hub

site, rather than distribute them into several hubs or buy multiple T-1 ports in a single MCI central office.

But because MCI will not bring up the service until mid-June, users that need the service now still have to go to LDDS WorldCom, the only long-distance carrier to offer high-speed frame relay today.

And, at least at first, MCI's high-speed frame relay offering

will max out where LDDS WorldCom's begins — at 6M bit/sec (see graphic).

MCI deliberately set its speeds at multiples of the T-1 standard of approximately 1.5M bit/sec, said Stephen Von Rump, MCI's director of data services marketing.

Users can buy access into the high-speed port by obtaining a

### More frame relay horsepower

Port speeds available on high-speed frame relay service, in megabits per second:

	LDDS WorldCom
Available today:	6, 10, 19.8
	MCI
Available in June:	3, 4.5, 6
Available in second half of 1996:	12

fractional T-3 circuit from the local exchange carrier. If fractional T-3 is not available, he added, MCI will support an inverse-multiplexing configuration.

MCI's unique usage-based pricing has typically favored users with low-speed applications and moderate network utilization.

Such users traditionally stick with 56K or 64K bit/sec ports at the outlying sites on a corporate network.

"But we have watched the average port speed creep up," Von Rump said.

Specific pricing from MCI and LDDS WorldCom remains pretty much under wraps. MCI is expected to file a tariff for the service before it goes live. LDDS WorldCom considers the service a value-added feature that does not have to be included in its frame relay tariff. But a 6M bit/sec port capable of bearing a traffic stream equal to four T-1s would cost less than four times a T-1 port, according to Emily Hansen, LDDS WorldCom product manager.

LDDS WorldCom does offer a pricing example in which 200 branch sites deliver data over 32K bit/sec PVCs to a host site connected to a 6M bit/sec frame relay port. Total monthly charge: \$41,140 before term and volume discounts.

A high-speed arrangement saves equipment and management costs, Hansen added.

Maintaining multiple T-1 ports typically requires load rebalancing, where users must continuously reevaluate how many of the branch PVCs can flow into each port, depending on shifting traffic patterns, she said.

"By aggregating those to one high-speed port, you only tie up one router port, and now you don't have to do that balancing step," Hansen said. ■

## AT&T abandons print service, but UARCO delivers

By Joanie Wexler  
Barrington, Ill.

AT&T has abandoned the plans it outlined last June to reshape the printing industry with a service it had labeled Network Print on Demand.

But never fear. A Chicago-area document management company has stepped up to the plate to offer exactly what AT&T had envisioned: distributed on-demand print services delivered over public WAN links.

An AT&T spokeswoman last week confirmed that AT&T has discontinued its Network Print on Demand effort. Under the original plan, the carrier had teamed with Xerox Corp. and, subsequently, several other companies in the graphics business to use its net for the storage and distribution of electronic print files (NW, June 26, 1995, page 8).

AT&T had hoped that Network Print on Demand would be available early this year. The spokeswoman said the company decided after market trials not to move ahead with the service, though she declined to say why.

But there is another answer for Fortune 1,000 firms looking to save big bucks on print warehousing and shipping costs. UARCO, Inc., a printing and document management company, last week launched a subsidiary called Impressions, in partnership with Xerox.

Impressions is delivering just such a distributed printing service — except that it runs across the Advantis value-added net.

With the UARCO system, users ship images electronically

from their customer location to the Impressions central production center in Chicago. Customers can use IP connections over dedicated, analog or ISDN lines either directly, through the Internet or through the Adobe Systems, Inc. Virtual Network.

At the production center, images are formatted and then forwarded to satellite document offices near customer sites where hard copies are needed. The documents are then printed and distributed locally (see graphic).

The service aims to accommodate companies that generate high volumes of collateral, forms or other documents that must be changed often. It is costly to print in short runs — or to print in large runs but store excess volumes that often become obso-

lete before they can be used, noted Dan Nero, UARCO director of technical development.

UARCO has teamed with Xerox, as well as IBM, for printing devices.

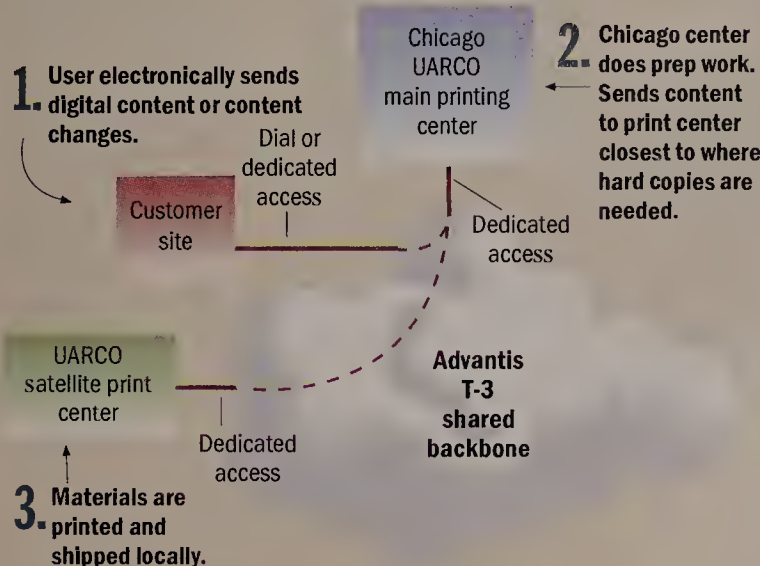
Xerox, which runs distributed print services for customers over dedicated links, said last June that some companies could save 60% on warehousing and shipping costs with such a service. UARCO puts that number between 45% and 55%.

But customers must examine the economic trade-offs, based on what they print, Nero said. He said that often it is better to get original content to the UARCO center by next-day courier rather than by network, particularly if it is a large color file.

©UARCO: (800) 877-4132.

### Distribute and print

Networks can enable the cost-effective printing and distribution of small quantities of materials.





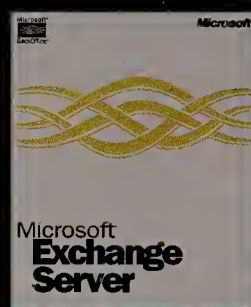


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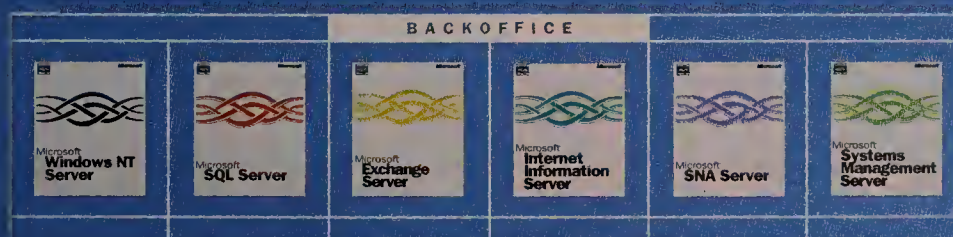
Microsoft® Exchange delivers more messages faster and more reliably than any other mail or groupware system. It's also more secure. With built-in features like encryption and digital signatures, unauthorized access is all but impossible. There are also built-in tracking tools that let you locate messages anywhere in the system. And in the event your system ever loses connection, Microsoft Exchange will automatically identify the source, notify you, and even fix it. Most importantly, all of this is possible over any network – your intranet or the Internet.

Collaborative business solutions can also be deployed with confidence. With Microsoft Exchange's powerful messaging infrastructure, you'll have the required reliability for group scheduling, bulletin boards, and customer tracking applications. Administration and integration are equally uncomplicated. The entire system can be managed from a single desktop. And, unlike other systems,

Messaging Requirements	Microsoft Exchange Server v4.0	Novell® Groupwise 4.1	Lotus® Notes r4.0
Scalable to widest range of hardware*	YES	NO	NO
Integrated Centralized Management Tools	YES	NO	NO
Integrated Internet Access (SMTP/MIME)	YES	NO	NO
Integrated X.400 (1984&1988)	YES	NO	NO
Built-In Group Scheduling	YES	YES	NO
Built-In Groupware	YES	NO	YES

Microsoft Exchange's multi-protocol open architecture provides native SMTP- and X.400-support, so it can peacefully coexist with almost any e-mail system. It even has built-in migration tools for Microsoft Mail, cc: Mail™, PROFS®, DEC All-In-1™, and Verimation Memo. So now you have every reason to make the move. And every assurance that it'll be worth it. To learn more, call (800) 426-9400, Dept. A234.

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## Meeting the Challenge of Client-Server Computing

# Maximizing Return-on-Investment of Network Computing

The migration to client-server computing is affecting organizations both large and small almost everywhere on the planet. Computer users today have extensive access to global network-based resources, including communication gateways to other companies, individuals, and markets worldwide. Signs of this connectedness abound:

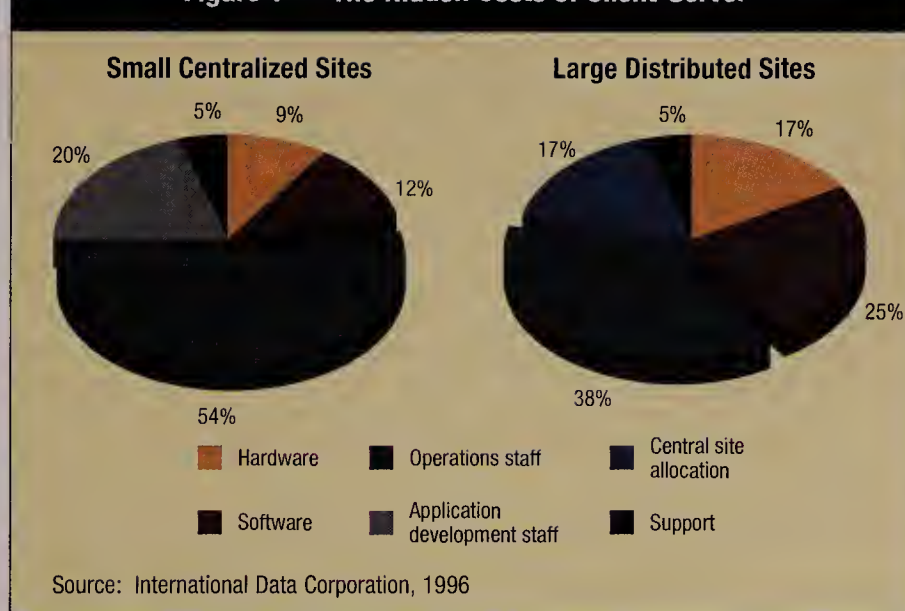
- Last year the number of LAN users worldwide hit nearly 100 million, double the number in 1993. By 1999 the number will double again
- In the same year the number of people in the world with electronic mail boxes topped 40 million. By 1999 the number will be over 125 million
- Groupware users numbered over 30 million worldwide by the end of 1995; by 1999 they will number over 250 million

So we are heading for a wired workplace, a wired marketplace, even a wired society. However, there is a price to be paid for all this connectivity. The nearly universal implementation of client-server systems requires living with new levels of complexity and new hardware and software that people must be trained to use. Moreover, highly skilled personnel must be hired to install, manage, maintain, and administer these far-flung networks. The result is that staffing costs have become the largest contributor to total networked computing costs, regardless of the size of the installation (see Figure 1).

Until now, companies have justified the costs and complexities of client-server computing by competitive advantage—it is a very flexible and adaptable computing style. But when client-server is the norm, where will the competitive advantage lie?

IDC believes that companies that learn to manage their networked resources through technology and training will win out over their peers in the long run. Companies that understand the true costs and true benefits of client-server computing

**Figure 1 — The Hidden Costs of Client-Server**



will generate quicker return for their investments. Companies that relentlessly optimize, integrate, and upgrade existing systems will stretch IT resources further and be able to reinvest sooner than competitors taking a wait-and-see approach.

### Areas of Opportunity

IDC and Novell have teamed to produce this White Paper in order to help IT managers develop a strategy for maximizing return on investment in networked computing resources. It is the executive overview of three studies researched and written by IDC and sponsored by Novell. In the research it conducted,

## Driving Down Networking Costs

### GroupWise:

Typical annual return-per-user of 334%

Nearly \$400,000 a year saved in phone costs at Farmland Foods

Courier costs cut \$16,000 a year at Sheppard, Mullin, Richter & Hampton

### NetWare 4:

On average 15% less expensive than NT Server from Microsoft

50% increase in users supported by a single server

### ManageWise:

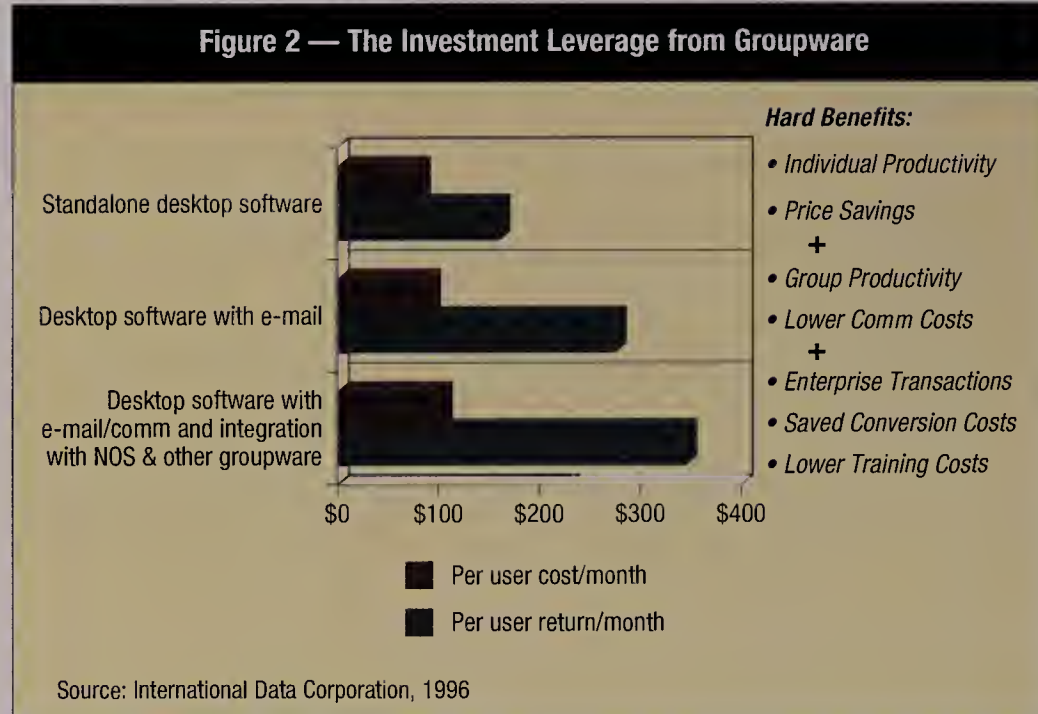
\$95,784 savings in business efficiency per 100 users

50% reduction in network downtime

19.7 day payback



**Figure 2 — The Investment Leverage from Groupware**



IDC found three areas of networked computing that are focal points for ROI leverage:

1. The choice and use of communication applications such as e-mail and groupware
2. The choice and use of next-generation network operating systems
3. The use of advanced network and system management tools

In addition, IDC found that when products in support of all three of these areas work together in an integrated fashion—such as Novell's GroupWise, NetWare 4.1, and ManageWise products—benefits are compounded. Support and training costs are lower, conversions and upgrades occur faster, applications come on stream sooner, and downtime is reduced.

#### Applications for the Next Wave

The migration to client-server computing is a quest to provide users with access to information and computer resources beyond their desks. One of the key tools for this is groupware software, epitomized by Novell's GroupWise, software which integrates e-mail with scheduling, calendaring, and other workgroup oriented functions. The market for groupware is exploding as organizations find they can use it—specifically the e-mail function—as a platform for providing workgroup and even enterprise-wide access to information and resources.

In the research IDC conducted, almost half of the business benefits organizations received from migrating to groupware came from better internal and external communications. For instance, Farmland Foods, a \$2 billion dollar meat processing company, found that since installing GroupWise, documents once faxed in 15 minutes now take less than five to e-mail. Further, the use of GroupWise saved almost \$400,000 in voice phone calls a year.

Figure 2 illustrates how electronic communication and collaboration generate cascading benefits. Standalone desktop software can impact individual productivity, but when combined with e-mail, that software can improve the productivity of a whole workgroup, not just the individual user. If the e-mail is specifically designed to work with the desktop software and with the network software, as say Novell's GroupWise is with NetWare 4.1, then those workgroup benefits are compounded.

This efficiency pays real dividends. When Sheppard, Mullin, Richter & Hampton, a Los Angeles law firm, made the move to GroupWise it found the support ratio for lawyers dropped from one assistant for every two lawyers to one for every three. GroupWise scheduling cut count-

less hours in tasks as routine as setting up meetings; GroupWise e-mail cut courier costs by \$16,000 a year.

For most companies, an investment in groupware is considered an incremental cost. The hardware is already in place, as is the network. Moreover, the support costs—which account for more than 50% of the cost of operating a networked PC—are shared across dozens of applications.

But even with all the hardware, network, and support costs amortized across the groupware software, it's a bargain. IDC's research with Novell's GroupWise customers found that a typical installation required only about \$250 in fully-loaded first-year costs—less than 5% of the annual cost of operating and supporting an end-user personal computer.

For that \$250 investment, those same GroupWise customers found that their first-year return was over \$800 on lowered communication and clerical costs alone. Meanwhile, they accrued an array of other concrete benefits, such as fewer meetings (and thus less travel and meeting administration), easier document handling, and so on. For every single GroupWise customer interviewed by IDC, return-on-investment exceeded expectations.

#### Modernizing the Network

If the LAN is the heart of client-server computing, then the network operating system is its soul. As LANs have evolved from peripheral information systems to the primary components of mission-critical systems, they have become more robust and more scalable. Along the way they have also provided IS personnel with the tools to manage network resources as never before.

In fact, powerful new management capabilities are why many people are migrating to NetWare 4.1. With more than 375,000



licenses installed worldwide as of 1995, it is the most popular network operating system. Three key reasons for its popularity are:

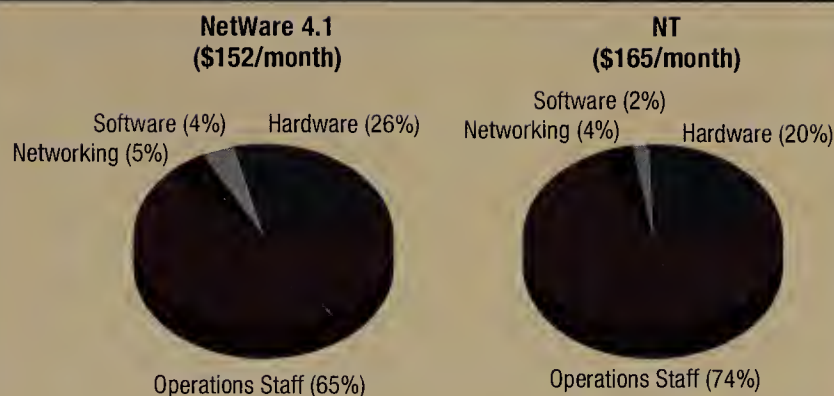
- Greater functionality
- Improved management
- Directory services

Figure 3 illustrates how survey respondents believe migrating to NetWare 4.1 has enhanced network productivity—with ease of administration at the top of the list, mentioned by nearly 40% of respondents. NetWare 4.1's greater functionality has promoted companies' reliance on LANs and delivered on the ultimate promise of client-server—increased productivity.

According to recent surveys conducted by IDC, LAN managers report remarkable improvements in managing their networks under NetWare 4.1. Although they expected the number of nodes on their networks to grow by 260% in the 12 months following installation, they anticipated the number of file servers on the network would grow by only 163%. In other words, under NetWare 4.1, they expect to increase the ratio of users per server from 41 to 60—an improvement of 50%.

In addition to increasing the number of users per server, NetWare 4.1 provides a single point of administration with Novell Directory Services (NDS) that results in a lower cost of network administration. Figure 4 shows how, in medium-sized

**Figure 4 — Network Cost-to-Use at Medium (300 User) Sites  
(Costs After Migrating from NetWare 3.X)**



Source: International Data Corporation, 1996

sites, NetWare 4.1 generates 14% lower network administration costs than Microsoft NT, primarily by increasing the user to support staff ratio.

Novell and other networking companies have set their sights on developing new technologies that will make tomorrow's networks more efficient and flexible. Novell has developed a Smart Global Network strategy, which entails making the network available to anyone—anytime, anywhere. An essential component of the Smart Global Network is Novell Directory Services (NDS), which enables companies to keep track of and connect all of a network's users, workgroups, hardware and software on one common access and administrative framework. NDS provides directory services technology that can handle the management of countless resources on heterogeneous systems spread around the globe. Also fundamental to Novell's vision of the future is an open set of application programming interfaces (APIs) that will make it easy to incorporate NDS and other NetWare 4 networking services into distributed applications.

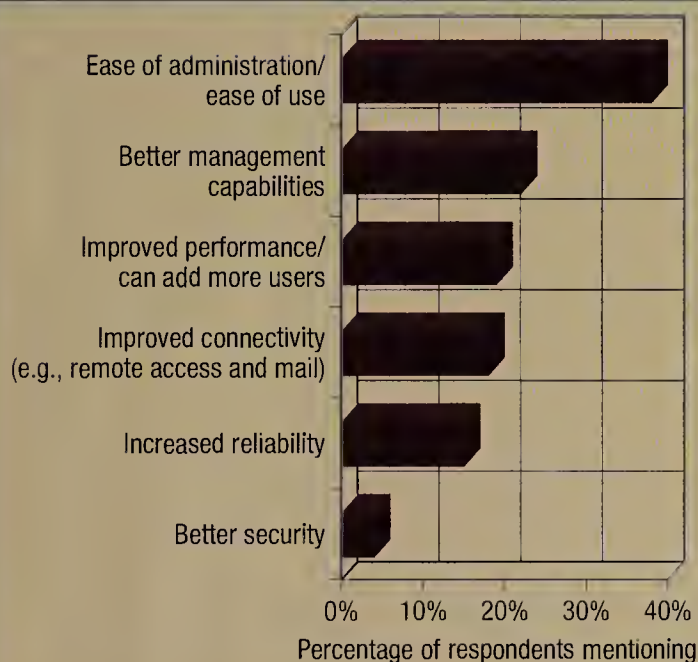
#### Providing End-to-End Network Management

Staffing costs and end-user productivity are the issues that keep IS managers awake at night. And that has never been more true than it is today. As networks expand and intertwine, the critical success factors for network managers will include:

- Increasing network uptime, both in operation and when installing new users or applications
- Increasing efficiency by supporting rapid network growth without commensurate growth in staff
- Increasing responsiveness, fixing problems in a way that minimizes idle time for users or within business processes

To meet these needs, Novell offers ManageWise. It combines both network management and PC administration into a single, integrated package. Previously, most PC administration and LAN management products worked independently of one another, each requiring dedicated staff and resources.

**Figure 3 — How NetWare 4.1  
Improves Network Productivity**



Source: International Data Corporation, 1996



ManageWise is the integrated solution that offers a single view of the network. It provides analysis tools for understanding bottlenecks; permits the configuration, inventory, and diagnostics of PCs from a single local or remote site; and provides tools for monitoring and managing remote and local servers. IDC's research demonstrates that even small and medium-sized companies can achieve significant cost savings by implementing ManageWise (see Figure 5). Network managers found that the most significant gains in efficiency were realized in server operation and help desk functions. Using ManageWise also increased LAN manager responsiveness. Before implementation, only 30% of network or end-user problems could be solved from a central site; afterwards, that number rose to 60%. This is especially important for companies with highly decentralized operations.

Since the software-licensing, maintenance, and training costs of a product like ManageWise are low compared to the number of users potentially affected, the return on investment can be surprisingly high. Across the survey base polled by IDC, ManageWise paid for itself on average within 19.7 days.

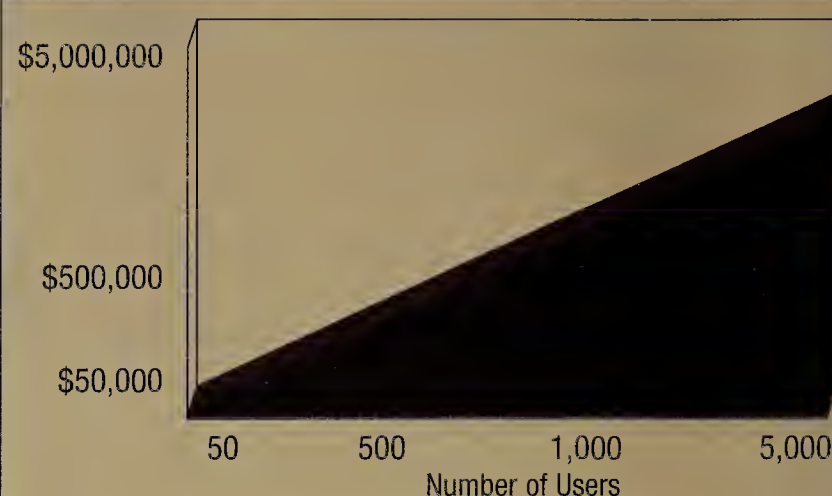
For every 100 users, implementing integrated management with ManageWise saved \$95,784 annually. These savings are attributable to the following:

- More efficient systems management, including an increase of 33% in the number of servers and 25% in the number of PCs a staff person can support, and a decrease in travel of 53%, leading to annual cost savings of \$14,500
- Significant reductions in the time required to perform key management tasks—such as five hours in moves and changes, nine hours in server maintenance and configuration, seven hours in help desk and support, four hours in problem tracking, three hours in printer maintenance, etc.—saving \$30,844 annually
- Dramatic reductions in network downtime (over 50%) due to network outages, delays addressing problems at the desktop, or time spent installing and configuring applications, generating annual savings of \$50,440

#### **Cost-Savings and Client-Server: They Aren't Mutually Exclusive**

Believe it or not, return on investment in networking can be quantified. While it may sometimes seem that networks are growing out of control, vendors like Novell are in fact working diligently to develop products for simplified, easily managed

**Figure 5 — Average Annual Savings From ManageWise**



Source: International Data Corporation, 1996

local, wide-area, and global networks. Because of the strategic and financial advantages of networking wherever systems reside and users roam, organizations will be forced to expand the reach and complexity of their networks simply to remain competitive.

Astute companies will concentrate on migrating to client-server computing in ways that maximize both the resources available to run networks and the effectiveness of those who ultimately generate revenues and profits—namely, end users.

### **Call to Action**

This is an executive overview of a three-part series of White Papers entitled:

- Novell GroupWise: Leveraging Desktop and Network Investments
- Novell NetWare 4.1: Reducing Cost of Ownership
- Novell ManageWise: Maximizing Returns on Networking Investments

For a free copy of the Novell Business Advisor containing tools that help you assess return on investment with NetWare, ManageWise, and GroupWise, as well as electronic versions of the IDC White Papers, call 1-800-665-4586 or visit either the Novell home page at <http://www.roi.novell.com> or the IDC home page at <http://www.idcresearch.com>



# Local Networks

**Covering:** Operating systems • LAN management  
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## Briefs

**Legato Systems, Inc.** has announced a new edition of NetWorker for NetWare. The **backup utility** includes a new feature, **SmartMedia**, that allows companies to create groups of backup tapes customized by topic, among other things.

In addition, the company announced client-based software, called **NetWorker Client for Windows 95**, that lets Windows 95 users back up their data to any NetWare, Windows NT or Unix server running NetWorker backup software.

NetWorker 4.0 for NetWare is shipping now, with prices starting at \$750. NetWorker Client for Windows 95 pricing starts at \$750 and is based on server software configurations.

Legato: (415) 812-6000.

**Remedy Corp.** recently announced a new version of its **Flashboards** application that **gathers help desk request data** and analyzes it before displaying the information to users in graphical form.

New features in **Flashboards 1.1** include notification to an administrator when customized thresholds of help desk calls are reached and increased integration with Remedy's **Action Request System**, its help desk application suite.

**Flashboards 1.1** will be available in June at a cost of \$5,000 for the server software and five client licenses.

Remedy: (415) 903-5200.

**Hummingbird Communications, Inc.** has launched **Columbus**, a suite of desktop applications designed to turn a Windows machine into an **intranet client**.

**Columbus** includes a Web browser, a notebook that organizes World-Wide Web addresses and documents, a Web server, an intelligent agent to collect data on the Web according to preset criteria and the **Verity, Inc.** search engine to parse through the collected data.

**Columbus** is available free by linking to <http://www.hummingbird.com>.

Hummingbird: (416) 470-1203.

## Unisys debuts SMP server line

*Technology to tie distributed clients and servers to mainframes also on deck.*

**By Ben Heskett**  
Blue Bell, Pa.

Unisys Corp. will release a line of symmetrical multiprocessing (SMP) servers this week that can be powered by up to 10 Pentium Pro processors using a new high-speed bus.

The new ClearPath SMP61000 servers are based on the Synchronous Coherent Memory (SCM) bus, the first

Pentium Pro board to be announced that scales beyond the four-processor Standard High Volume (SHV) boards currently being built by Intel Corp., according to analysts. The SHV boards are not yet available, but many hardware vendors are testing them for their Pentium Pro servers.

The Unisys servers initially will have more power than the operating system software available to run on them.

The servers will run Windows NT 3.5 with up to four processors in an SMP configuration, but the network operating system (NOS) cannot currently scale beyond that, according to Unisys officials.

With the release of Windows NT 4.0, scheduled for the second

half of this year, the Microsoft Corp. NOS will be able take advantage of at least eight processors with adequate scalability. Unisys' own brand of Unix, called SVR4/MP, and UnixWare 2.1 will also be supported. They can take advantage of 10-processor configurations.

The SCM bus will be available this month for 150-MHz Pentium chips and by September for 200-MHz Pentium Pro chips. The bus also allows users to put both Pentium and Pentium Pros in the same box.

"Maybe that signals a significant change of direction for them," noted Jerry Sheridan, an

### UNISYS UNVEILS SMP SERVER LINE

**Product:** ClearPath SMP61000 Pentium- and Pentium Pro-based servers

**Description:** Intel-based hardware scaling from 2 to 10 processors, with Pentium chips matched with 2M bytes of Level 2 cache and Pentium Pro chips matched with 4M bytes of Level 3 cache. Also features Unisys' Synchronous Coherent Memory bus offering speeds of 533M bytes/sec. Outfitted with 7 PCI slots and 5 EISA expansion slots.

**Price:** Typical configuration of 4 Pentium processors ranges in price from \$90,000 to \$150,000.

**Availability:** This month for Pentium-based configurations; September for Pentium Pro-based systems.



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Local Networks.



## Merlin to add Internet tricks to OS/2

**By Kevin Fogarty**  
Las Vegas

IBM is taking the wraps off a new version of its OS/2 desktop operating system, code-named Merlin, that is designed to be all things to all people.

The new operating system simplifies IBM's OS/2 Warp product line by combining OS/2 Warp and the remote connectivity features of OS/2 Warp Connect. Merlin also bolsters OS/2 Warp by including NetWare and Windows NT Server clients, as well as by building in TCP/IP support and a suite of Internet applications.

It also includes file caching and synchronization, as well as an enhanced ability to run Windows applications natively through the support of Windows APIs.

In short, Merlin is designed to be "the universal client for everything from LANs to mainframes," said Jeffery Howard, worldwide OS/2 brand manager for IBM's Personal Software Products Division.

"Their intention is to be the one-stop shop [operating system], and they're actually offering you the power to do that," said Frank Dzubeck, president of Washington, D.C. consultancy

Communications Network Architects, Inc.

Merlin is full-featured, but not as full-figured as it might seem, Dzubeck said. The software should run comfortably in 8M or 16M bytes of RAM, he added. "It's not as big a hog as you might think; NT is worse," Dzubeck said.

Merlin will include a built-in World-Wide Web browser and will let users create icons on the desktop that represent URLs. Users can click on the icons to go to a site. They also can store the icons to disk, in effect making their bookmarks portable, Howard said.

Merlin will include access to File Transfer Protocol servers

through a drag-and-drop interface accessible from a folder on the desktop.

The operating system includes clients for NetWare 4.1, with support for Novell Directory Services, and IBM's Personal Communications/3270 for mainframe access across TCP/IP networks. It also includes support for peer-to-peer networking — an ability IBM has promised for years.

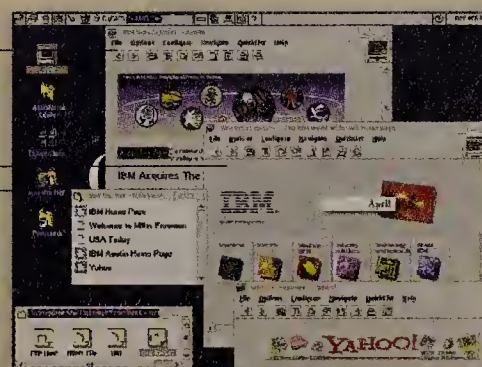
For remote connectivity, Merlin features a dialer and a Mobile File Synchronization utility that allows users to take shared files off-line, then update them automatically with master versions on the server.

©IBM: (800) 426-3333.

### MERLIN EDITION OF OS/2 WARP

The operating system will natively support FTP and other Internet protocols, allow users to keep more than one Web page open at a time ...

... and represent URLs as icons on the desktop for easy access.



analyst with Dataquest, Inc., a consultancy in San Jose, Calif. "Rather than taking the old established technology, they're going to change the focus and come out of the gate with leading-edge technology."

Sheridan said OEM agreements are on the horizon for the SCM bus technology. According to sources, an agreement with Data General Corp. is in the works.

The SMP61000 servers are designed to run databases from Oracle Corp., Sybase, Inc. and others, as well as distributed management software from IBM's new Tivoli subsidiary. Unisys officials stressed the systems' ability to handle on-line transaction processing requirements with ease.

The servers are designed to fit well in a variety of network environments, including those running Ethernet, token ring, X.25 and FDDI.

### Heterogeneous multiprocessing

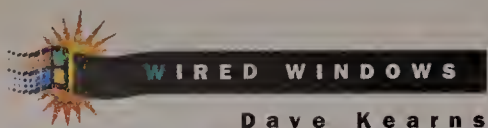
Unisys also is announcing a new software and hardware technology, called heterogeneous multiprocessing (HMP), that ties distributed clients and servers to mainframes.

The technology features a software layer that resides on top of the server operating system and allows for multiple operating systems to run on different processors in one box.

That feature is combined with software for message passing as well as an Ethernet card to tie enterprise servers to mainframes.

©Unisys: (800) 874-8647, Ext. 230.





## So you're going to bypass Windows 95?

**I**ncreasingly, I'm coming across network managers and IS professionals who are going to skip implementing Windows 95 and instead go to Windows NT Workstation 4.0 when it's released later this year.

They point to NT's more robust architecture, tighter security and better net-

work components as the major reasons for thinking this way. These folks consider NT to be an industrial-strength Windows desktop implementation suitable for business use and relegate Windows 95 to the home market.

If you're among this crowd, you might be feeling pretty smug. But you may also

be in danger of severely lacerating yourself on the cutting edge of technology.

One of the things that gives Windows 95 its "less than robust" tag is its support of your older DOS and Windows 3.X software. This backward-compatibility, while not 100%, allows you to use almost all of your current business applications after you've updated your operating system. Windows NT is much less compatible.

And don't think that you're safe just because you've been updating to 32-bit versions of your applications. Even though Microsoft has decreed that any software carrying the Windows 95 logo must also run on Windows NT, not every software package declaring itself "Windows 95 Compatible," "Windows 95 Ready" or even a "Windows 95 Version" also carries the logo.

Even some of Microsoft's products, released as Windows 95 versions, have problems running on Windows NT — at least on the beta releases of NT 4.0. These products include Microsoft Access for Windows 95, Microsoft Excel for Windows 95 and Microsoft Money for Windows 95.

If you're already running NT Server 3.51 as your network operating system, there should be little problem integrating NT Workstation 4.0 with it. But if you're running NetWare and trying to decide between Windows 95 and Windows NT workstation as your desktop operating system, there's reason to pause.

Although many people have experienced problems with Novell's Client32 for Windows 95, it's still considered a better implementation than Novell's requester for Windows NT. Novell has promised a Client32 version for NT by the end of the year.

Microsoft's implementation of client software for NetWare revolves around Microsoft's NetWare Gateway technology, which lacks logon script support, among other things.

### Tip of the week

*If you routinely administer shared group or electronic mail directories on a NetWare 4.1 network, you may be interested in an offering from Netoria Pty. Ltd. Its Netorix is an NWADMIN snap-in that extends the NetWare Directory Services schema and provides administrators with an NWADMIN page to manage a Group Directory and MailDirectory for each user, similar to the Home Directory. The program is available via the Web at <http://www.netoria.com/products/netorix.htm>.*

I urge you to take another look at the applications you're running if you have decided to put all desktop operating system upgrades on hold, continue with Windows 3.X and hope that Microsoft delivers on the promise of the operating system code-named Cairo sometime next year or the year after.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at [dkearns@msn.com](mailto:dkearns@msn.com).*



If your visions of the future look anything like this, Networks3 is the next best thing to a good therapist.

Put your fears about the future of networking to rest at the premier event of this season: Networks3. Taking place this June 3rd–6th at the Westin Hotel in Santa Clara, the event will provide key insights into future technologies as well as opportunities to exchange ideas with peers and learn how to integrate new technologies.

Along with renowned industry speakers, the event will feature thirty-two different networking workshops as well as a Technology Solutions Lab, where network

design consultants will demonstrate customized solutions to tough network challenges.

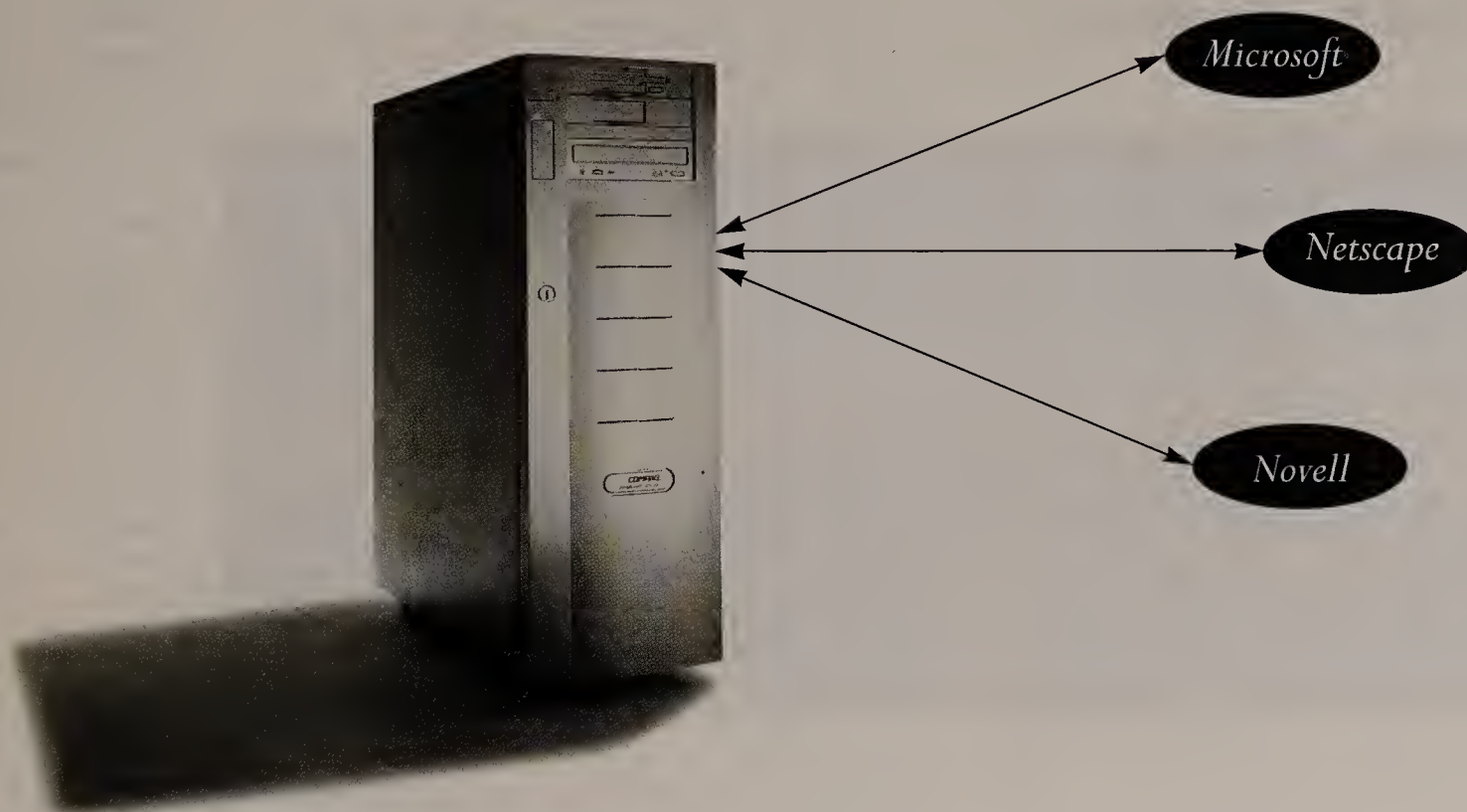
The cost of attendance is \$395 per person. But if you register before May 3, you'll save \$100. For more event information or to register, call 1-800-746-2185. Or reference our web site at <http://www.3com.com>





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## NET RESULTS

## When centralizing servers, be aware of net pitfalls



Skip MacAskill and Melinda Le Baron

**F**inding a home for devices on campus LANs may seem routine, but in fact, it can have dire consequences — particularly when you are talking about server placement.

A server placed strategically can streamline traffic flow, while a server three router hops away from the primary work-

group it serves can negatively impact network performance.

There is a growing trend to centralize servers that were once distributed.

The driving forces behind this centralization include cost-saving measures and the need to ease the management burden for the staff that supports the serv-

ers and the applications.

These are tangible benefits. Centralizing servers can save 15% compared to the costs associated with running the average distributed network.

Consolidating 32 distributed servers, for example, into six superservers will show immediate savings in both personnel and component costs. In one particular cost study, the reduction resulted in a 45% savings in component costs and a 80% savings in personnel costs, for a total savings of nearly \$3.5 million.

When server centralization is planned in conjunction with a network upgrade that supports a change in traffic flow, MIS and all users of the network benefit. (The ancillary, centralizing servers — without doing an in-depth network analysis — can flood the backbone with traffic that causes sessions to disconnect unexpectedly.)

In the centralized server model, many individual departmental servers are replaced with a superserver attached to the network backbone, often located in the MIS department.

This gives rise to the inverse 80/20 rule, where 80% of the workgroup traffic traverses the backbone and 20% of the traffic stays local for such functions as print service.

It is helpful to use the bandwidth hierarchy principle to effectively design a multitiered network for centralized computing. This principle states that bandwidth is smallest at the endstation or user end, must increase as a sum of the aggregate LANs into the secondary backbone, and increase again as the sum of the secondary backbones into the corporate or campus backbone.

By following this principle, enough bandwidth is provided to effectively handle all of the traffic as it is consolidated.

To accommodate this change in traffic flow, high-speed interfaces into routers and switches will be needed. At the wiring closet, we recommend that individual network segments be aggregated into higher speed secondary backbones with the use of switches.

Secondary backbones are increasingly based on FDDI and Fast Ethernet. The secondary backbones are then connected into collapsed backbone routers. FDDI switches could then be used to interconnect the collapsed backbone routers, thereby providing better access to the centralized servers.

This design provides the added benefit of keeping departmental traffic off the backbone due to the logical segmentation of the collapsed backbone router.

The upshot: To centralize servers effectively, network managers need to analyze their individual models and investigate the possible use of higher speed LANs as secondary and corporate backbones to support the centralization efforts.

MacAskill is a senior research analyst and Le Baron is a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 316-1111 or at inquiry@gartner.com.

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## Briefs

■ **PC DOCS, Inc.** this quarter will ship Version 3.0 of its **document management system**, which has customizable security, extended network support, and several document search and retrieval improvements. DOCS Open 3.0 also has a new naming service that eliminates the need for multiple net logons.

DOCS Open costs \$349 per user and \$795 per server. PC DOCS also announced DOCS Interchange for Microsoft Exchange, software for moving documents between DOCS Open and Exchange. Pricing was not available.

PC DOCS: (617) 273-3800.

■ **Baranof Software, Inc.** has begun shipping MailCheck for Exchange, a version of its **messaging management** software for Microsoft Corp.'s new messaging product. The software lets administrators do end-to-end monitoring of electronic mail networks and displays a picture of mailboxes, gateways and remote users via a graphical user interface. The Simple Network Management Protocol-compliant software costs \$295.

Baranof: (617) 926-6626.

■ **IBM** has announced extensions to its **imaging and workflow** products. The company has rolled out new client software that lets users see FlowMark workflow lists from Lotus Development Corp. Notes desktops. Available in June, the interface will be free to existing customers.

IBM also introduced The Internet Connection to ImagePlus, which will allow users to retrieve information stored in an IBM ImagePlus library via the World-Wide Web.

Internet Connection will be available later this year. Pricing was not available.

In addition, the company announced expanded platform support, including Windows NT servers, for ImagePlus and FlowMark.

IBM: (800) 426-3333.

## Novell goes on offensive with more secure GroupWise

*Though written for Department of Defense contract, GroupWise for DMS will be tweaked for the commercial market.*

By Ellen Messmer  
and Carol Sliwa  
Washington, D.C.

Novell, Inc. is building a version of its GroupWise messaging software to conform to the X.400, X.500 and security standards on which the Defense Department's huge electronic messaging system is based.

Novell's effort underlines the company's determination not to be shut out of the vast federal market. Novell failed a year ago to win the kind of Defense Message System (DMS) award that went to Microsoft Corp. and Lotus Development Corp. as members of the Loral Federal Systems team — the main contractor for DMS.

The Novell product, to be called GroupWise for DMS, will not be released until it passes stringent Open Systems Interconnection and encryption testing to be conducted by the military's Joint Interoperability and Test Center (JITC) at Fort Huachuca in Arizona. DMS is designed to work with the National Security Agency's Fortezza encryption PC cards, which use a key-escrow technique so the government can decrypt the user's messages if necessary.

Eldon Greenwood, director of product management for GroupWise, said DMS certification is not likely to be completed before year-end. The DMS security architecture offers some improvements, such as desktop-to-desktop encryption, over the current GroupWise product, he said.

Novell plans to develop a commercial version of GroupWise for DMS that will swap out the military encryption algorithms for RSA Data Security, Inc.'s public-key technology.

Emmett Paige, the Defense Department's assistant secretary for command, control, communications and intelligence, said

military personnel and other federal employees will be allowed to buy GroupWise for DMS if it passes inspection. "Any messaging product that is certified as DMS-compliant by government-approved testing will qualify for DMS use," he said.

The DMS contract, intended to provide the military with its next-generation messaging, is proceeding at a painfully slow pace. Greg Lobdell, Microsoft group product manager for mes-

saging and Internet services, said Exchange DMS is in beta test but the final version will not be ready until the second half of this year. At some point, X.400/X.500 interoperability testing of Exchange against Lotus Notes for DMS will have to be done. A Lotus spokesman said Notes is on target to meet the government's July 31 deadline for interoperability testing.

The Defense Information Systems Agency (DISA) has

been pressuring Lotus and Microsoft to not only support X.400/X.500 messaging, but also a basic level of groupware interoperability. But Lobdell said there has been little progress on that front under DMS. The commercial sector has started to respond to the need for database conversion between the existing Lotus Notes and Microsoft Exchange with products like The MESA Group's JumpStart, Lobdell added. ■



Defense Department's Paige says employees can buy GroupWise for DMS if it passes inspection.

## IBM digs into data mining

By Sari Kalin

IBM has announced new data mining and decision-support products, pitching them as providing "business intelligence for the rest of us."

The Intelligent Miner Toolkit, a compilation of advanced algorithms and processing tools, will enable developers to write applications that analyze, extract and validate data on networked computers, company officials said.

**Consultancy META Group of Stamford, Conn., expects revenue from data mining products and services in the U.S. to explode in coming years.**

Year	Revenue (\$)
1995	\$120M
2000	\$1B

The kit's algorithms — once available only to IBM's large customers — can spot data trends and patterns, whether the data is stored in flat files, relational databases or parallel databases, officials said. Using these algorithms, applications can do deviation detection, classification and predictive modeling, as well as sequential pattern discovery.

IBM also introduced the Intelligent Decision Server (IDS), LAN-based advanced decision-support software that relies on decision-support software originally developed by former IBM subsidiary Metaphor,

Inc. IDS includes a set of some 200 ready-to-use analytical processes that can be invoked by client front ends, including Lotus Development Corp.'s Notes software or a World-Wide Web browser. The processes run against data stored in IBM or non-IBM database.

IBM also unveiled three customizable applications that make use of the advanced data mining algorithms: customer segmentation, which lets users carve up marketing data to get a handle on customer behavior; market basket analysis, for understanding and predicting customer buying behavior; and fraud detection.

The firm also announced that its consulting and services division will help customers deploy the tool kit and the applications.

Analysts said the biggest beneficiaries of the data mining tool kit would be IBM's current customers — especially given the AIX-only availability. Marrying off-the-shelf data mining tools to legacy data is often a daunting task, and with the growing popularity of data mining, IBM's tool kit will be the hook to keep existing customers from defecting.

"Someone that has a legacy IBM system and is thinking of getting into data mining or data warehousing might be tempted to set up a separate RISC/Unix solution using off-the-shelf tools," said Rick Whiting, senior analyst at Summit Strategies in Boston. "This tool kit helps keep the installed base happy."

For Intelligent Miner and the

Learn more on  
Network World Fusion  
(<http://www.nwfusion.com>).

Resources include:

- An overview of the Defense Message System
- A look at military-approved security in Lotus and Microsoft groupware offerings
- Lists of military-approved products and the criteria used to judge them

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new data mining applications, beta testing will begin this month on IBM RISC System/6000 servers running AIX with clients supporting AIX, Windows 3.1 and Windows 95.

The product will be generally available in the third quarter, with Application System/400 and System/390 versions scheduled to be announced later this year.

For IDS, beta testing will begin in June. The product will be available in September on OS/2, with support for OS/2, Windows 3.1 and Windows 95 clients. An AIX version will be available by year-end.

Pricing for all three products has not been determined. Officials promised the price tags will be very affordable.

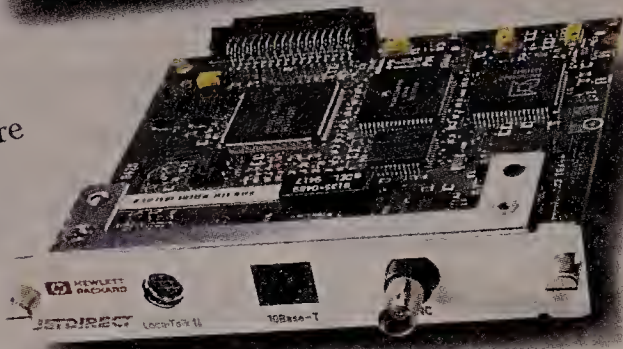
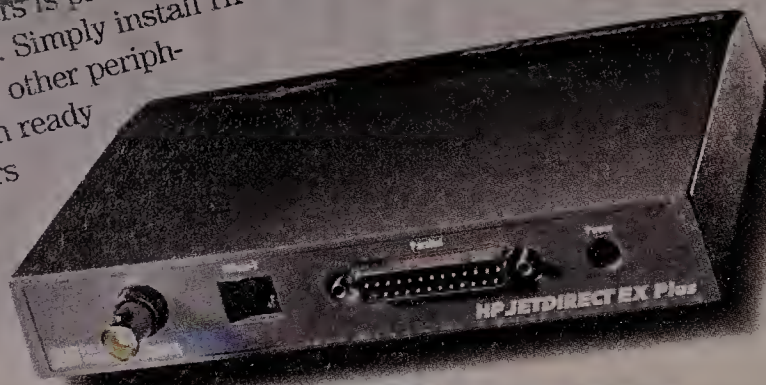
For more information, contact IBM at (914) 766-1900.

Kalin is a correspondent for IDG News Service.

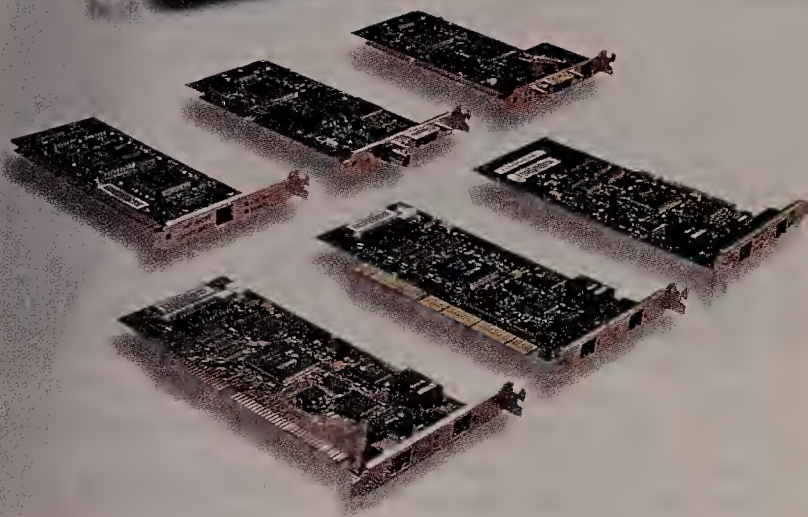


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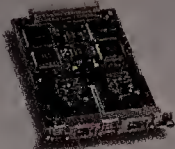
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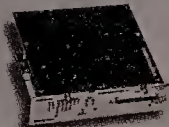


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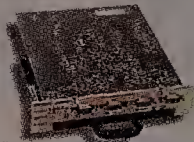




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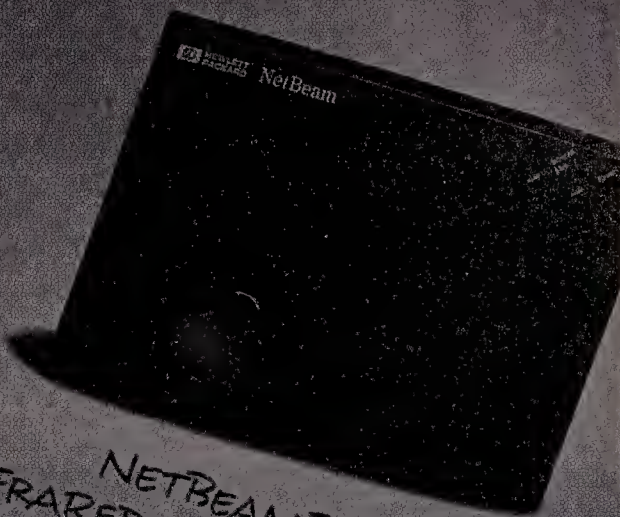


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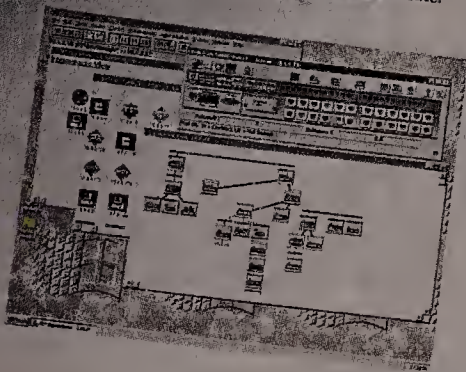
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## SHARED LOGIC

## Getting your arms around intranet server bundles

**F**eeling overwhelmed with all the new Internet and intranet products hitting the market? If so, there might be a solution for you: the integrated intranet server.

Vendors have begun marrying Inter-

net electronic messaging post offices and interactive server applications — such as World-Wide Web, Usenet news and File Transfer Protocol offerings — on Unix or Windows NT server platforms. They are targeting the offerings at departments

within companies of all sizes.

Vendors are coming at the market from three basic directions.

First, vendors such as Isocor and Microsoft Corp., which have strong proprietary or standards-based messaging

products, are repackaging their server products with Internet mail and Web server technologies.

Second, Netscape Communications Corp. and other leading Web product vendors are mixing in E-mail and other applications.

Third, network operating system vendors such as Novell, Inc. and Banyan Systems, Inc. are retooling their directory services and recasting their products as intranet NOSes.

The integrated intranet server concept is new, so vendors are still sorting out what will be included in their bundles. But here are some tips on what to look for if you decide to go the integrated intranet server route:

■ Are you getting enough Internet mail functionality? In addition to the Post Office Protocol (POP) 3 and Simple Mail Transfer Protocol staples, vendors should support Extended SMTP standards for clean 8-bit transfer and delivery status notifications, as well as the Internet Message Access Protocol (IMAP).

■ Is straight Internet messaging functionality rich enough? You may want groupware capabilities like group scheduling and discussion databases integrated with your mail system. Also, since many messaging environments are still quite heterogeneous, you may require migration options for directory synchronization and gateways to proprietary mail systems or to X.400.

■ Will your integrated intranet solution perform when a drove of Web users descends on a server that's already coping with a heavy stream of messages? Where needed, mirroring of Web content should be automatic. You should also be able to split server functions across multiple physical server systems without losing the integrated management.

■ How will the system fit into your security architecture? Your E-mail post office should provide authenticated POP or IMAP access to prevent password theft. The Web server should be capable of providing access control lists, Secure Hypertext Transfer Protocol/Secure Sockets Layer, and a transparent proxy service between your employees and the Internet.

■ Can you tie the server to other applications? You'll want to make sure the Web server talks to SQL databases, for example, and that it can support Java for the future.

Above all, look for strong management and security capabilities. Intranet NOS functionality is promised but not here yet, and managing intense levels of user Web and Java activity on top of mail could be more of a challenge than you think.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.



Daniel Blum

## NetworkWorld

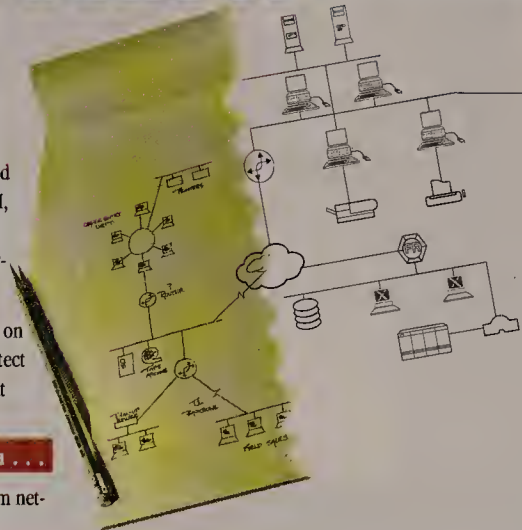
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- Compare the technologies and operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation of Ethernet, IEEE 802.3, token ring and FDDI, and key performance characteristics of these technologies
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards

- Utilize available software tools in the network optimization and modeling process
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- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Understand the operation of IP-based routing
- Match the appropriate LAN application with the WAN broadband technology
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# Intranets & the 'Net

**Covering:** Internet Technologies and Services  
for Collaboration and Electronic Commerce

## Briefs

■ **Quarterdeck Corp.** has begun shipping *IWare Internet-Suite* for Novell NetWare, an Internet/intranet access package for **Novell, Inc. networks.** The software, which includes an IPX-to-IP gateway and bundled applications such as Quarterdeck Mosaic, electronic mail, news, File Transfer Protocol and telnet, starts at \$1,195 for a five-concurrent license and \$10,995 for a 100-user concurrent license. Quarterdeck: (310) 309-3700.

■ In hopes of seeing its security technology established as the de facto standard, **Cylink Corp.** has decided to make its *Passport Gold* tool kit available for free to anyone who wants to embed its **public-key encryption** and digital signature features into software applications. Cylink: (408) 774-6439.

■ **CKS North America** has introduced *MyNet*, an **authentication server** that lets users log on to all their applications, whether from Microsoft Corp. Windows and NT workstation, IBM OS/2 and MS-DOS, on the corporate intranet via one logon. CKS NA: (412) 928-3300.

■ **Network Engineering Technology, Inc.** last week promised to pay **\$10,000** to anyone who can punch a hole through its firewall product between May 1 and May 31. For more details on the firewall challenge, check out the company's Web site at <http://thefirewall.com>.

■ **Secure Dynamics, Inc.,** which makes hardware tokens for generating onetime passwords for **user authentication** across the Internet, is now developing a software-based version of its product for use on Windows and NT workstations in the corporate intranet. Secure Dynamics: (617) 547-7820.

■ **20/20 Software, Inc.** is offering *NET-Install*, a \$149 **installation program** for distribution and setup of software and files via a corporation's internal Web infrastructure. 20/20 Software: (503) 520-0504.

## Feds buy on-line

*Agencies offer Web-based catalogs for purchases.*

**By Ellen Messmer**

Two federal agencies that act as purchasing agents for the rest of government have launched World-Wide Web-based catalogs for on-line purchasing.

The General Services Administration and the Defense Logistics Agency (DLA) have each set up electronic catalogs to sell the defense and civilian agencies everything from medical and office supplies to clothing.

Army personnel with an authorization code and password are just beginning to order clothing off the DLA's Web-based Ascot catalog, said Stephen Whitmore, DLA project manager.

### How it works

Once purchase orders are completed on-line, the information is sent over the Department of Defense's IP network called the Milnet, where it is converted into electronic data interchange format through a mainframe translator.

"Our trading partners, such as Milliken, also want the purchase information in EDI format," Whitmore said. While buying via Web catalogs is new for the DLA, EDI is not. Last year, it did \$3.5 billion of business with the private sector using EDI.

The GSA, which has just rolled out its Advantage Web catalog, also captures the incoming purchase information in EDI format, said Teresa Sorrenti, GSA director of acquisition operations for electronic commerce.

The GSA uses the Netscape Communications Corp. secure Web server, requiring users to have the encryption-capable Netscape browser to order items and pay for them with a special-issue procurement card from VISA called IMPAC.

Procurement cards are a type of credit card that lets an organization place tight controls on

how and where it is used.

Now only GSA stock warehouse items, such as furniture, are available via Advantage. But the agency is putting the contents of the 5,000 contracts known as the Federal Supply Schedule program on the Web.

Contractors must have electronic catalogs and support EDI in their catalog, invoice and purchase orders. "If the order is generated by Advantage, it will go out to the vendor as an EDI 850 order," Sorrenti said.

The GSA views Advantage as the eventual replacement for the older on-line proprietary system called the Milstrip/Fedstrip, which required a week of training for government procurement specialists.

While Advantage is far simpler, the GSA has discovered that one obstacle to its use is that not everyone in government has access to the Internet.

To expand access to Advantage, the GSA is working with Netscape to develop a special browser that will dial Advantage directly over a private network instead of the Internet.

## Alpha Microsystems pushes pages that update themselves

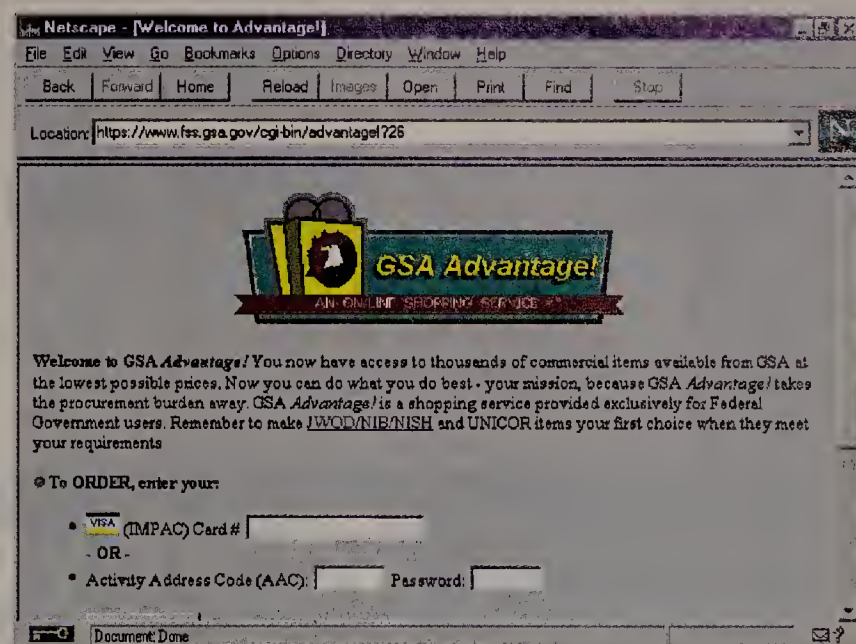
**By Carol Sliwa**

*Santa Ana, Calif.*

Alpha Microsystems next month will release a software product that can retrieve data from legacy applications and feed it into self-updating World-Wide Web pages.

But that's only part of the picture. AlphaConnect also can harvest data from Internet sites, either via HyperText Transfer Protocol or File Transfer Protocol, and transfer the information to another Web site or to an array of Windows-compatible applications.

"It provides multiple capabilities," said Douglas Tullio, Alpha Microsystems president and chief executive officer. "Originally, this had started out as the possibility of being three or four different products. We elected to incorporate it all into one and



Government purchasers can buy products off the Web with GSA Advantage.

Vendors are also getting into the on-line catalog act to reach the vast government market. FedCenter is a Web site shared by 3Com Corp., Compaq Computer Corp., IBM, Informix, Inc., Lotus Development Corp. and Sybase, Inc., among others. At FedCenter, federal buyers can compare prices and products listed on Federal Supply Service contracts before buying at the GSA Web site.

But with concerns about Internet security, the federal government is still a long way from plunging wholesale onto the

Web for purchasing.

The branch of the DLA that sells 160,000 types of medical supplies to military forces maintains a proprietary catalog and ordering system called Medical Electronic Customer Assistance (MECA), which transmits orders in EDI directly to vendors such as Bristol-Meyers, Inc.

There are no plans to migrate from MECA to the Web, said John Roberts, systems analyst at the DLA directorate of medical material, who noted that a private, closed system is far more secure. ■

has been using a test version of AlphaConnect to pull down stock prices from the New York Stock Exchange and NASDAQ. "I can configure [the software] to automatically update our Web site," D'Alessandro said. "It's very easy to use."



**Alpha Microsystems'** Tullio says AlphaConnect is an incorporation of several products.

Denny Michael, Alpha Microsystems director of marketing, said a company selling products over the Internet might want to use the AlphaConnect software to update inventory figures on its Website.

A free copy of the beta version of AlphaConnect is available from the company's Web site at [www.alpha-micro.com/ac](http://www.alpha-micro.com/ac).

The final product will cost between \$100 and \$150, according to Tullio. Volume discounts will be available.

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## Keeping Up with Network Technologies and Standards

## NETWORK HELP DESK

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**Can you recommend an alternative to Novell, Inc.'s WSUpdate utility? We have used WSUpdate and a system logon script to post company policies on everyone's Microsoft Corp. Windows 95 clients as they log on to a NetWare server.**

However, users have been able to bypass this process by altering the date in their logon file. Hopefully, I'll be able to find some freeware alternative.

**Kent Nemoto, via Network World  
Fusion**

A brute force approach might be in order, says Ron Nutter, a Master Certified Novell Engineer in the Lexington, Ky., area. Try executing a batch file from the logon script that copies the policy file you want to use. Create a group just for your Windows 95 users that looks like:

```

If member of "Win95" then begin
#POLICY END.

```

The #POLICY statement looks for a batch file named `policy.bat`, executes that file and then returns to processing the logon script.

Another option is to have the user execute the batch file when exiting the logon script by placing EXIT "POLICY" at the end of the logon script.

If not all of your workstations are running Windows 95, you can also use the same logic when copying the file from within the system logon script.

Tom Cobb, technical support product specialist at Stream International, Inc., a software reseller and support company in Westwood, Mass., suggests you visit C/NET, Inc.'s shareware site on the World-Wide Web at <http://www.shareware.com/>.

The Web site provides access to the Virtual Software Library (VSL) tool, which enables you to search, browse and download freeware or shareware applications, demonstration copies of programs, as well as fixes, patches and upgrades to the software maintained on the site. The VSL is a database of over 160,000 files drawn from 33 top Internet hardware and software companies.

# ATM virtual trunking provides the best of private, public nets

### By Simon Banks

The manageability and cost-effectiveness of enterprise Asynchronous Transfer Mode networks might just depend on virtual trunking, a subtle interface feature between private and public switches.

ATM virtual trunking essentially lets network managers build hybrid public/private networks.

Such architectures promise to reduce costs and improve service, just as virtual private network (VPN) services have done for voice. Similar to VPN services, virtual trunking lets managers control their private ATM networks, even though they run over public ATM services.

Unlike VPN service, however, virtual trunking depends more on the private ATM switches than on carrier facilities. The enterprise switches use virtual paths to extend congestion management and other value-added features across the public network. Sophisticated queue management techniques and the ability to forward statistics, topology and configuration information is needed to carry a mix of traffic types effectively.

## Virtual control

With virtual trunking, network managers can centrally control remote ATM switches. This helps preserve the full functionality of ATM switches across the wide area.

Equally important, virtual trunking lets network managers run different speed trunks from each site into the public ATM network.

This means a site with a 1.544M bit/sec trunk can connect to a site with a 155M bit/sec trunk using a virtual path while other sites connect at 45M bit/sec into the same location, for example. By contrast, a point-to-point physical 45M bit/sec trunk would require a 45M bit/sec leased line.

As a result, ATM virtual trunking allows sophisticated hybrid networks. Users can have a preferred route based on a private

leased line, and if that is unavailable or full, they can then employ an ATM service. This allows network managers to build high-availability, multiservice networks without spending a fortune on leased lines.

Virtual trunking also enables the use of enterprise-based switched virtual circuits (SVC)

the three basic choices network managers have for interconnecting switches across a public ATM network.

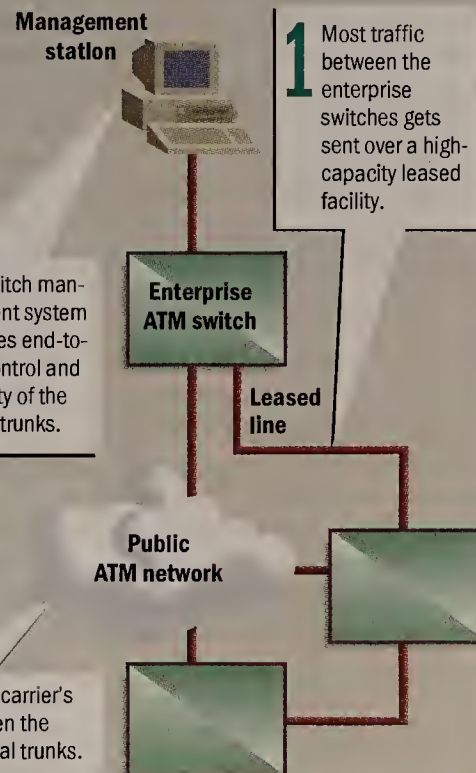
First, they can rely on the ATM Forum's User-Network Interface (UNI). With UNI, the private switch's network management system may not be able to see through the public ATM

# UP CLOSE

## Hybrid ATM networks

Network managers building ATM networks can use dedicated high-capacity links to handle traffic between enterprise switches, and carrier services to catch the overflow and add resiliency.

**2** Overflow traffic goes into the carrier's ATM cloud and travels between the enterprise switches over virtual trunks.



over a public ATM network that does not directly support SVCs. Carriers have been reluctant to provide SVC service because of the enormous task required to account for and bill thousands — even millions — of calls, some lasting only a second or two. In effect, virtual trunking lets enterprise ATM equipment create SVCs within the virtual paths crossing the public network.

The availability of SVCs within the enterprise is important for emerging services, such as LAN Emulation. What's more, SVCs will be useful for transporting voice calls directly to their destinations when enterprise switches begin interpreting Common Channel Signaling information from private branch exchanges.

ATM virtual trunking is one of

cloud, so sites connected only via the public network become logically isolated. In addition, UNI connections disable important congestion management features found on advanced switches.

The second alternative is peer-to-peer networking in which the enterprise switch becomes a node in the public network. As a peer, the private switch participates in the routing decisions and traffic management of the carrier-owned network. A routing protocol in progress within the ATM Forum could be used for this purpose.

However, the use of a common routing protocol is unacceptable for many users because the enterprise switch is logically part of the carrier's network and can be affected by other customers' traffic. In addition, security

problems at one site can affect everyone's internal routing decisions and routing table sizes. This can introduce significant delays and increase the complexity of network control and administration.

In the virtual trunking model, the enterprise ATM switch connects to the public network ATM UNI through one physical trunk but can route connections to multiple virtual trunks. Carriers need only support virtual path switching and ignore virtual channel identifiers (VCI).

Each virtual trunk is mapped to one virtual path connection (VPC); multiple virtual trunks are supported by creating multiple VPCs. Because the virtual trunk is switched as a virtual path, it is possible to rob some VCI bits for transporting congestion control information.

To network managers, virtual trunks appear as physical links in everything but price: They cost 10% to 15% less than physical circuits. This is because a company only needs to lease local-loop lines and not long-distance connections. A company can realize additional savings of up to 20% if it pays for traffic on a per-cell basis.

## Migration plan

On the down side, standards do not yet exist for the technology. However, virtual trunking deserves attention as a logical progression from leased-line and frame relay networks. With virtual trunking, network managers can take advantage of SVCs, provide greater network resilience and flexibility and extend the advanced features of ATM enterprise switches across the wide area.

*Banks is enterprise networks marketing manager at StrataCom, Inc., a San Jose, Calif.-based supplier of wide-area ATM switches. He can be contacted at (408) 882-2178.*

## Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at [bschultz@nww.com](mailto:bschultz@nww.com).



## EDITORIAL INSIGHTS

### The empty keynote

**W**ebster's dictionary defines a keynote as "an address designed to present the issues of primary interest to an assembly and often to arouse unity and enthusiasm."

Yeah, right.

Webster apparently never attended a keynote address at one of the major network events, at which the pillars of our industry use their allotted hour in the limelight only to market their products. As the high-tech theatrics expand — the laser lights, the operatic theme music — the meat in these keynote speeches dwindles to nothing.

Case in point: Bill Gates' opening speech at NetWorld+Interop 96, where software's top dog skipped his "Business Communication and the Internet" theme to bash competitors and pitch Microsoft's Exchange messaging system.



When I arrived at the Las Vegas Hilton, a line of waiting keynote attendees already snaked around the block. Once inside, admittedly due to circumstances beyond Gates' control, listeners had to cool their heels for a half hour beyond the scheduled start time — their ears assaulted by a blaring

*Blade Runner*-esque score — to hear little of substance.

Gates began by talking about the great success of Windows 95, went on to describe how NT is outselling NetWare and proceeded into the sales spiel for Exchange — as if that product hasn't gotten enough ink and attention since the project began in 1990.

In response, audience members voted with their feet: Scores left the hall midway through the talk. I'm not surprised — many paid close to \$1,000 to attend Interop and deserved better.

I single out Gates because of his unique position in the industry. Millions of people have bought into his products and they want his insights into where technology is heading. Unfortunately, he isn't alone in abusing the keynote privilege.

Like other members of the customer community, I attend conferences to learn, and I'm frustrated. Is it too much to ask for people like Gates to break some new intellectual ground when they have such an audience? Can't conference organizers ensure better keynote quality for the attendees who shell out their hard-earned cash?

We all deserve better than these shameless marketing pitches.  
John Gallant, editor in chief jgallant@nww.com

## IBM 8285 Workgroup Switch gives the green light to desktop ATM

**T**he release of IBM's 8285 ATM Workgroup Switch late last month is a watershed for the desktop ATM market. While many analysts have written off desktop ATM as dead on arrival, this product shows that the technology is on track and is, cost-wise, a viable alternative to much less powerful Ethernet and token-ring solutions.

In fact, all at once, the major technical and market impediments to desktop ATM are being swept away, revealing what looks to be a technology sector finally ready to blossom.

One impediment that has been surmounted is cost. Prior to the 8285, desktop ATM was just too expensive to be considered for most workgroup environments. One could expect to pay \$500 for a network adapter and around \$600 per port. Net managers compared this \$1,100 per-seat outlay with costs under \$500 for various Ethernet solutions and found it was difficult to justify even investigating desktop ATM.

The 8285 brings the per-seat price of desktop ATM down to \$495; other vendors' prices are expected to fall accordingly. Now desktop ATM, which provides switched, full-duplex 25.6M bit/sec bandwidth over Category 3 unshielded twisted-pair cables, costs essentially the same as Fast Ethernet, token ring and switched 10M bit/sec Ethernet.

Another impediment that has been overcome is the lack of standards and interoperability. Through no one's fault, ATM standards develop at a relatively slow pace. While this also affects backbone ATM, it has a greater negative impact on ATM to the desktop. When ATM is used simply as a backbone transport between routers, many functions — such as LAN Emulation — simply are not needed at endstations. And proprietary schemes to move the traffic in and out of the ATM cloud can be employed transparent to the end systems.

At the desktop, the ability to run legacy Network Driver Interface Specification or Open Datalink Interface LAN applications is mandatory. Prestandard LAN Emulation schemes meant handpicking the various workstation hardware and software that were known — usually only by the vendors — to work with a particular switch. The limitations were so severe that no sane network manager would consider using the technology as a standard workgroup solution.

Now standards ratified last year have been turned into operational code. More and more vendors are implementing the ATM Forum's LANE 1.0, and product choices increase daily. My organization has, for example, successfully used LANE 1.0-compliant 155M bit/sec ATM adapters to provide high-speed Windows NT 3.51 and NetWare 4.1 server connections from Fore Systems, Inc., IBM and Newbridge Networks ATM switches. No interoperability problems were encountered.

A third impediment that has been eliminated is lack of drivers for corporate endstations. Because



Kevin Tolly

of the focus on high performance, most early ATM adapters were targeted at high-end workstations. So finding a 155M bit/sec adapter for a Sun Microsystems, Inc. SPARCstation with Sun OS drivers was not usually a problem. Finding a 155M bit/sec PCI adapter with Windows NT 3.51 drivers was another story. Bus types and operating system drivers critical to corporate net-

works were simply not available — even just six months ago.

Now bus and operating system selection is good enough for net managers to take ATM seriously. Fortunately, the PC world is converging on the PCI bus for both high- and low-end PCs.

Drivers for NT and NetWare servers are easy to come by. At the desktop, the dominance of Windows 3.1 again makes developing drivers for that operating system the obvious priority for adapter vendors.

Network managers with unusual endstation requirements will still need to do research before they buy, but those in the mainstream should have no trouble finding what they need.

*All at once, the major technical and market impediments to desktop ATM are being swept away, revealing what looks to be a technology sector finally ready to blossom.*

A fourth impediment that has been surmounted is lack of legacy integration. Previously, desktop ATM networks were best suited to providing the cliched "islands of connectivity." That is, one could build an ATM network fairly easily if there was no need to access resources connected to legacy networks. Integration, when there was any, was between desktop ATM and Ethernet networks.

Unfortunately, the users most likely to buy in to the strategic nature of desktop ATM almost always were running large token-ring networks. Without a solid integration plan, there was no plan at all.

By the end of this year, users will be able to buy industry-standard devices from IBM — and, presumably, other vendors — that will offer bidirectional integration between existing token-ring and desktop ATM networks. In IBM's case, the 8281 LAN Bridge provides the hardware and software to accomplish this. In fact, the device is available today, but only with IBM's prestandard LAN Emulation code.

IBM should lower the 8281's \$16,000 price, but even the cost can be justified for a device that provides the essential link between the legacy and ATM environments. IBM has even addressed the concerns of users that have IBM Type I (shielded twisted-pair) cabling by providing connectors that will allow ATM to run over that existing cabling.

Let's not kid ourselves, ATM still has a long way to go. The technology itself is inherently more complex than, say, shared 10M bit/sec Ethernet. But it has a lot more to offer. For existing token-ring users, it is really the only viable option.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com or <http://www.tolly.com>.

## Teletoons

By Phil Frank and Joe Troise  
guru@well.com





### Pork Chop Bill: The Telecom Act of '96



**James Carlini**

**T**he Telecommunications Act of 1996 is not that great a piece of legislation, unless you're a regional Bell operating company or a Washington, D.C. bureaucrat looking to find a new staff position in a federal agency. It's got more pork in it than a Jimmy Dean sausage.

The act contains sections that, in effect, guarantee rates to carriers that might lose market share as a result of increased competition, as well as the creation of several funds and agencies that sound good if you're in favor of bureaucratic and corporate welfare.

For example, the act creates an entity called the Telecommunications Development Fund that has three main goals: to provide capital in the form of loans or other investments for small businesses; to fund studies and research on emerging technologies; and to support universal service to rural and urban areas. It also will be a source of new jobs for bureaucrats caught in the current wave of government downsizing.

The act also establishes a Federal-State Joint Board on Universal Service to advise the Federal Communications Commission on modifying the definition of universal service. But redefining what universal service is and creating a mechanism to fund every eligible phone company to provide it might prove to be a form of "telewelfare." This does not encourage competitiveness; it rewards stagnant organizations that will be losing their monopoly market share to new entrants in their territories.

If creating a fund to subsidize local telephone companies were not enough, the act also establishes a nonprofit, private corporation called the National Education Technology Funding Corp. Part of its mission involves distributing funds collected from federal agencies to primary and secondary schools to promote technology and universal access.

This all sounds good, but who will be judging whether this money is being spent wisely?

For example, some school districts are already buying RBOC distance learning solutions that some critics say are overdesigned and overpriced. This RBOC sales tactic is just another mechanism to siphon federal money in the guise of adding technology to schools.

As for opening competition, parts of the act actually guarantee a closed market for certain services to carriers that obviously had some good lobbyists. For example, there's a section that guarantees exclusivity to RBOCs that bought alarm monitoring services prior to the signing of the bill. How much did Ameritech — which bought National Guardian Alarm Services last year — pay its lobbyists to get that piece of tenderloin into the bill?

Another dubious section of the act involves pole attachments and rights-of-way. Utilities that "own" or "control" poles, conduits, ducts and rights-of-way have to follow certain pricing guidelines when charging other entities for their use. The act discusses how utilities should apportion the cost of providing access to other carriers.

Wait a second! The rights-of-way are owned by the municipalities; the utilities only lease them. Nowhere in the act is it stated that the utilities have to share that revenue with the municipalities.

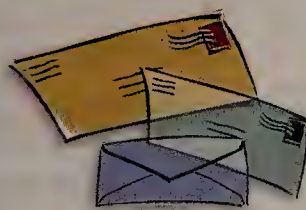
Wake up, local government — your ability to set right-to-use fees has just been locked up. From a users' perspective, this means that your firm, as well as you as an individual, will be paying higher taxes to offset the shortfall caused by the municipalities not being able to charge the real values for rights-of-way. Where were all of the local government lawyers and council members when this idea was being baked?

The states also appear to have been out to lunch while certain sections of the act were finalized. According to the act, a state public utilities commission has to get joint approval from the utility on the selection of a firm to audit the utility. How does this promote objectivity?

If all of this pork has you sizzling, send your comments to the main force behind the Telecom Act, Senate Commerce Committee Chairman Larry Pressler (R-S.D.), at [larry\\_pressler@pressler.senate.gov](mailto:larry_pressler@pressler.senate.gov). Maybe by turning up the heat we can burn some of the fat out of this legislation.

*Carlini is president of Carlini & Associates, Inc., a strategic information technologies consulting firm in Hinsdale, Ill. He can be reached at (708) 986-1888 or via the Internet at [carlini@nwu.edu](mailto:carlini@nwu.edu).*

## MESSAGE



## QUEUE

### Hands off my data

I found your article "Crime: It's just a hot link away" (March 18, page 1) both interesting and disturbing. It was interesting because it reminded me how many gullible people there are.

Except for the sidebar on Web sites, almost every crime mentioned either had nothing at all to do with computers (except that computers replaced telephones, notepads and so forth) or could apply equally well to newspapers and other advertising media. We need to stay aware that the valid-

ity of an offer is not affected by the medium by which the offer is made.

The most disturbing part of the article, to me, was the quote by National Computer Security Association President Peter Tippet, who said, "I believe in Commercial Key Escrow so someone can get into your data."

Why does he want to get into my data? Maybe I really do need Pretty Good Privacy to protect myself from him!

*Calvin Crumrine  
Analyst/programmer  
Alaska Division of Investments  
Juneau*

### Crime and Punishment

Mark Gibbs' stance in the column "Fighting crime with IT: How safe do you want to be?" (April 1, page 126) misses the mark very badly. The points he misses are: Crime is a human problem, not an IT problem; and crime is a problem of criminals, not one of law-abiding citizens.

Numerous studies by the Federal Bureau

of Investigation and Department of Justice have repeatedly shown that roughly 90% of violent crime in the U.S. is perpetrated by less than 10% of the criminal population. Not the population at large, but the population of convicted criminals.

Based on this information, it seems clear that the first approach to reducing or eliminating violent crime must begin by addressing this violent 10%.

Until the government is willing to remove these violent individuals from society, and keep them out of society, I see no compelling reason for the law-abiding majority to relinquish their personal liberties that remain.

When — actually, if — the U.S. government, especially the judicial system, sees the folly of early release, parole and plea-bargaining where violent offenders are concerned, I will be willing to rethink my position. Until then, I see no reason for law-abiding citizens to bear the burden so violent criminals may be further mollycoddled in the joke we refer to as a penal system.

*Doug Franklin  
Atlanta*

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# IP over ATM

*It'll be quite a climb, but there are steps you can take to make it work now.*

By Elisabeth Horwitt

Implementing an ATM backbone would be a lot easier for McDonald's Corp. "if we could just go pure ATM right away," says Chuck Rush, systems project manager for the fast-food giant. "But the reality is we already have something that works quite well."

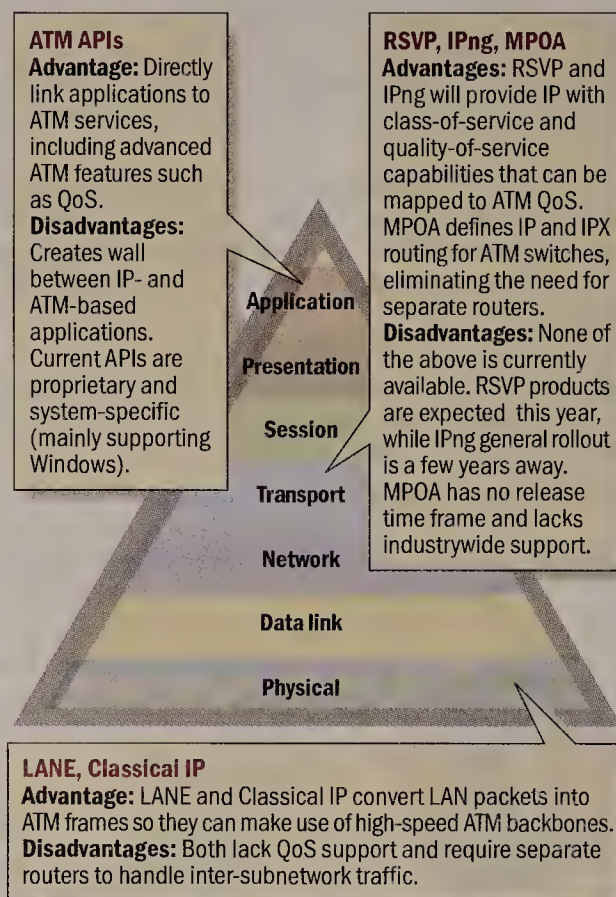
As is the case for many companies, that "something" is a router-based backbone supporting lots of legacy applications and systems that rely heavily on TCP/IP to communicate. Since those legacy applications and systems are not going away in a hurry, companies like McDonald's are struggling to come up with an effective strategy for Asynchronous Transfer Mode, which have some fundamental differences.

For many users, the optimal solution is an IP-aware ATM switch that allows legacy IP-based systems to bypass the bottleneck that routers can create and take full advantage of ATM's powerful throughput and intelligent bandwidth allocation, says Fred McClimans, a principal at Decisys, Inc., a Sterling, Va.-based consultancy.

Ipsilon Networks, Inc.'s recently introduced IP Switch ATM 1600 is said to offer those capabilities (NW, March 4, page 1). But there's a trade-off in that the switch does not support any of the ATM Forum standards for interswitch interoperability, and Ipsilon has no plans to include such support, a

## ALL ROADS LEAD TO ATM

Here are your options for mapping existing IP and other LAN traffic to ATM nets



company spokesman says.

So if you want IP-to-ATM integration in the near future but are leery of wedding yourself to one ATM switch vendor, you've got three options from which to choose: Classical IP, LAN Emulation (LANE) or ATM permanent virtual circuits (PVC). Each technique has gained broad support from the ATM switching industry over the past year, but they offer integration on a much shallower level than is promised by Ipsilon's switch. Basically, they enable IP systems to take advantage of a 155M bit/sec ATM "fat pipe," but not of advanced ATM bandwidth allocation features such as quality of service (QoS).

That's enough to convince some users to get started.

McDonald's, for example, is looking to get the cost-performance benefits of putting IP on the fat pipe while also getting its users and network engineers up to speed on ATM technology. Furthermore, the company hopes it will have a head start on the competition when the next generation of standards go commercial, putting fuller IP-to-ATM





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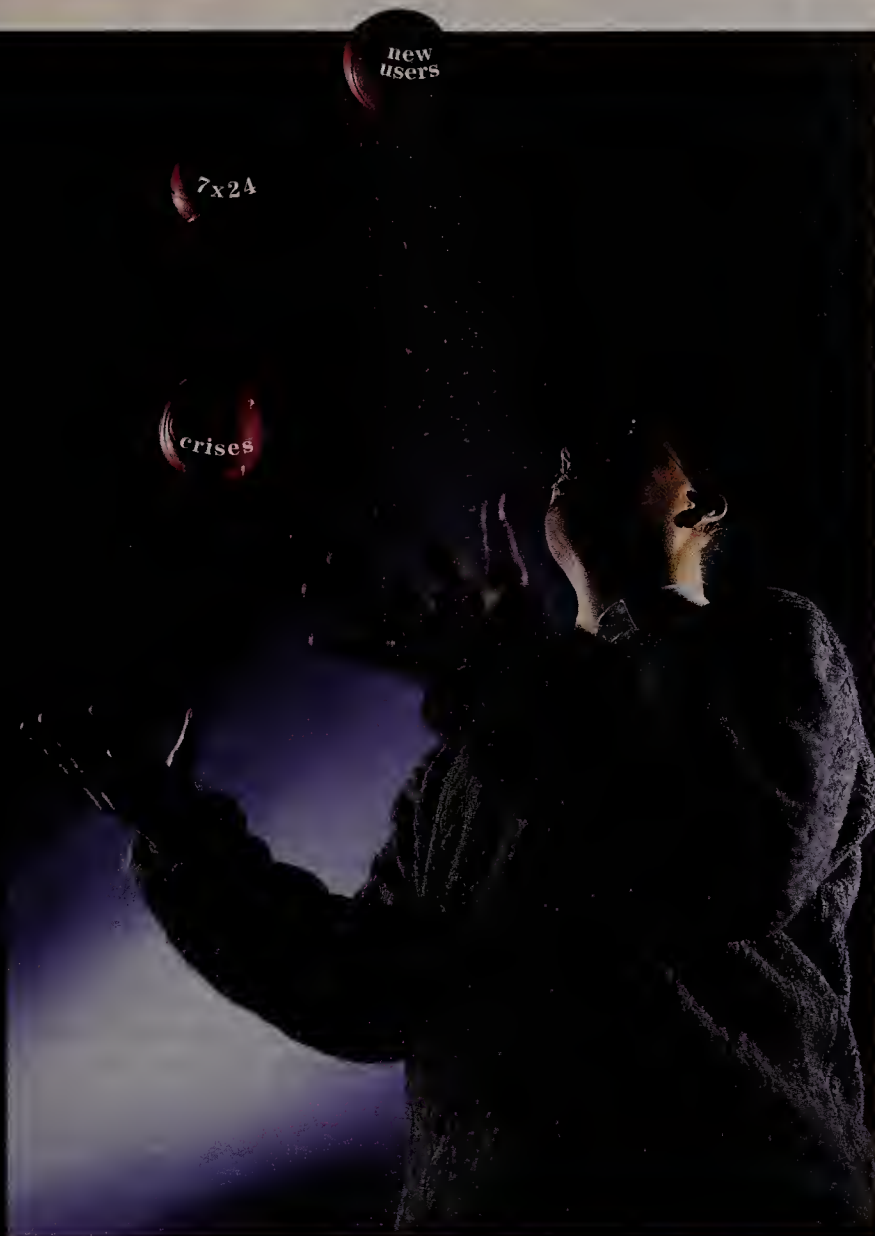
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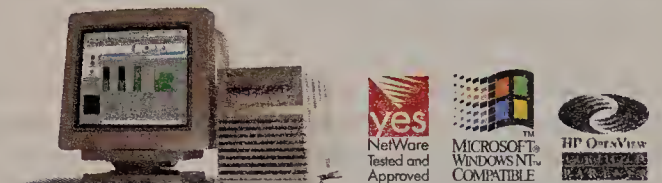
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integration within reach.

### PVC pros and cons

Another ATM pioneer, MarketVision Corp., started its evaluation of IP-to-ATM solutions by looking at PVCs — a form of ATM networking in which switches predefine paths between devices that need to communicate, then maintain those paths in static routing tables.

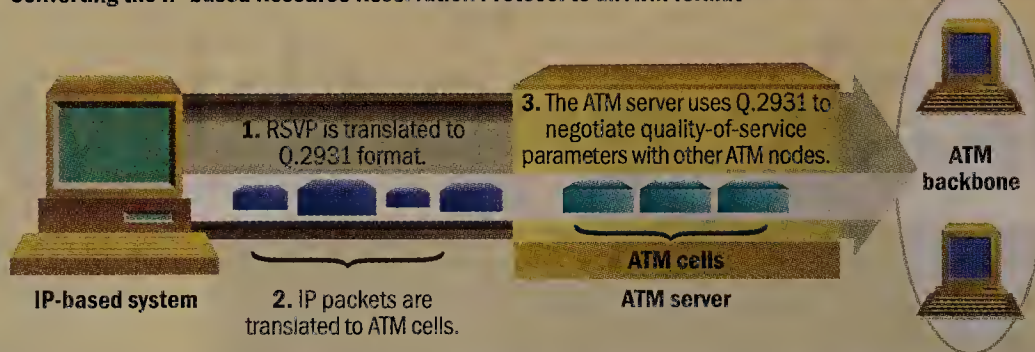
PVCs involve far less initial overhead than switched virtual circuits (SVC), says Marc Albert, a senior software engineer at MarketVision, a New York-based computer services firm. That's because, unlike SVCs, PVCs do not require ATM nodes to negotiate a new route for each new communications session. PVCs also allow users to set up IP routes over ATM backbones in a "highly deterministic way," he says. Plus "the code has been around a long time; it's stable, it has a high success rate in production environments."

But PVCs have one big drawback: "Administering them can be a nightmare," Albert says. PVC tables do not make use of a dynamic routing protocol such as IP's Open Shortest Path First or ATM's Packet Network-to-Network Interface. That means every change of address or route, every addition or deletion of a node, must be configured manually.

"This is a time-consuming and error-prone process," particularly for large and/or volatile networks, Albert says. MarketVision, whose network fits both those descriptions, decided against a PVC-based ATM strategy. The company is now looking into using SVCs in combination with LANE.

### Negotiating the deal

Converting the IP-based Resource Reservation Protocol to an ATM format



### Encapsulation: Simple but limited

LANE, along with the IETF's Classical IP, in the last year has shipped in products from leading switch vendors such as Cisco Systems, Inc., 3Com Corp. and Fore Systems, Inc.

Both protocols chop up LAN packets into ATM cells so they can be shipped over an ATM backbone. LANE encapsulates at the data link or Ethernet level, so it works independently of transport protocols such as IP or IPX. Classical IP, on the other hand, works at the transport layer, directly encapsulating only IP packets. This makes LANE more suitable than Classical IP for companies like McDonald's and MarketVision that run a mix of transport protocols besides IP.

Users warned that product compliance with the above standards does not guarantee multivendor interoperability. MarketVision discovered some fuzzy areas in both LANE and Classical IP specifications that resulted in differing — and incompatible — vendor interpretations, Albert

says. Vendors say those differences are being ironed out.

Current encapsulation standards also share one major functional limitation: They are basically bridging protocols that send any and all LAN traffic over the ATM connection. As a result, a router is still required on each LAN to direct traffic between subnetworks while helping to avoid broadcast storms. LANE and Classical IP, thus, "force everything to go through the router bottleneck," Decisys' McClimans says.

For almost a year now, the National Aeronautics and Space Administration's Ames Research Center has been evaluating Classical IP as well as Fore's proprietary IP-to-ATM encapsulation scheme, dubbed the Simple Protocol for ATM Network Signaling. "SPANS works fine on the LAN but doesn't scale up to the WAN" because of the bridging/broadcasting problem, says Noemi Berry, a network systems engineer at Ames. "Classical IP does the job, but routers are still involved."

Ipsilon's pledge to "bypass the router bottleneck" is one reason Ames is now looking at the IP Switch ATM 1600, Berry says. The product is said to negotiate a network path with the IP end devices, then cut directly over to the high-speed ATM switching fabric. Another attractive feature is its masking of ATM switching complexities. "If you know IP switching, you can use it," Berry says.

On the fence are companies such as MarketVision and McDonald's, which are willing to put up with the limitations of current standards to stay in the industry's mainstream — and hopefully retain their freedom to mix and match and migrate between different ATM products.

McDonald's is currently evaluating LANE-based offerings from major vendors such as Cisco, 3Com and Bay Networks, Inc. "[LANE] is a first shot" at addressing IP-to-ATM integration, McDonald's Rush says. Waiting in the wings are "more robust, easier to manage" ATM Forum standards that offer a far deeper level of integration between ATM- and LAN-based transport protocols like IP, he adds.

### The next generation: A distant promise

One such standard, Multiprotocol Over ATM (MPOA), allows ATM switches to route LAN-based traffic between subnetworks, eliminating the router bottlenecks that can occur with LANE and Classical IP. Unfortunately, MPOA recently suffered a setback when Bay Networks withdrew from the ATM Forum

standards effort, announcing its intention to develop its own standard. Since MPOA's prime backer is Bay rival Cisco, this sets up "an ugly schism, and possibly two independent MPOA standards," MarketVision's Albert says.

The other type of standard now in the works enables connectionless transport protocols such as IP and IPX to employ ATM's QoS features.

QoS enables an application or system to petition an ATM switch for an end-to-end circuit with specific parameters, such as maximum delivery or delay time. This allows ATM switches to efficiently allocate network resources among applications with very different needs. For example, LAN data traffic may be able to tolerate some delivery delays but minimal bit loss, while ATM-based desktop video can afford to lose a few frames but needs guaranteed delivery time.

Without QoS, a company needs to leave plenty of extra capacity on its ATM network to prevent one type of transmission from crowding out another (a giant file transfer or broadcast message knocking out an executive videoconference, for example).

► Check out what the IETF's IP over ATM working group is up to on Network World Fusion. You'll find the group's charter and Internet draft documents on topics ranging from support for multicast and IP broadcasts over ATM to definitions of managed objects and a number of RFCs.

**NetworkWorld Fusion**  
<http://www.nwfusion.com>

## Lawrence Livermore tries proprietary route

If you need to deliver ATM all the way to the desktop but do not want to wait for the ATM Forum to deliver an API standard, your main options are proprietary.

Microsoft Corp., for instance, has announced Asynchronous Transfer Mode support for its WinSock Version 2 API for Windows. IBM is working on a similar API for OS/2.

But writing applications directly to an ATM API has one main drawback: It creates a wall between ATM-based systems and legacy applications that are written to routing protocols such as IP. To any router or other device looking for IP addresses, ATM-based systems are invisible, says Thomas Nolle, president of consultancy CIMI Corp.

Lawrence Livermore National Laboratory is in the process of testing a First Virtual Corp. middleware product called Media Operating System (MOS) as a potential solution to this problem. The product does intelligent mapping between ATM APIs and standard Microsoft APIs such as WinSock and Media Control Interface, according to Doug Tsui, director of strategic marketing and business development for First Virtual, based in Santa Clara, Calif.

Furthermore, MOS allows legacy LAN-based applications to transmit over an ATM backbone via LAN Emulation (LANE), the ATM encapsulation protocol, Tsui says.

LANE support "lets us put IP and ATM traffic over the same unshielded twisted-pair connection," says David Dirks, project manager at Lawrence Livermore. "We can deliver training, traditional IP traffic and Web services without having to rip out cabling." Dirks' group is an informal organization of experts in areas such as video and high-speed networking that develops technical solutions and makes them available throughout the enterprise. "The driving force for us is to find a way as soon as we can to get multimedia to the desktop, as cost-effectively as possible," he says.

The group is waiting eagerly for First Virtual's promised delivery of MOS support for the Macintosh, given it has 13,500 of them installed. "We've also asked them to look at Windows NT and Unix," Dirks says. First Virtual has not yet committed to supporting either, according to Tsui.

One crucial question that Dirks says has yet to be answered is, "What will happen when we really load up the ATM network with traffic?" And, more specifically, "When a lot of video traffic is on ATM, and you try to run IP, what will it look like?"

— Elisabeth Horwitt

"When you start using QoS, that's when you really start getting the benefits of ATM on the WAN," Albert says.

QoS is also crucial for companies that want to mix SNA and IP traffic over an ATM backbone without having bursts of IP knock out an SNA session. SNA, a connection-oriented protocol, has built-in QoS features of its own, which IBM expects to map to ATM QoS within a year, a company spokesman says.

But IP and IPX are ill-suited to doing QoS negotiations because they are connectionless — the route any given packet takes across the network is not determined in advance. And IP encapsulation standards such as LANE and Classical IP do not support QoS.

Help is on the way. The question is, how soon will it arrive? Novell, Inc. is expected to provide ATM support for its upcoming Connection-Oriented IPX at an undisclosed time. And the forthcoming IP Next Generation (IPng, also known as IPv6) is expected to include QoS fields that can be mapped to ATM QoS. However, corporate users are not expected to begin rolling out IPng this side of the millennium.

In the shorter term, ATM switch vendors are looking to map the existing IETF Resource Reservation Protocol (RSVP) to ATM QoS parameters for IP and IPX (see graphic). Initially, RSVP will "extend QoS to the LAN station without the need to extend ATM to the LAN sta-

See IP over ATM, page 45





# Fax server

# FACE-OFF

By Stuart Melnitsky

## Cheyenne's FAXserve wins NetWare fax server software match.

If you can't stand the clutter of a pile of faxes in your in-box every morning, maybe it's time to consider network-based facsimile services. By putting faxes on your screen and letting you send out faxes from your applications, they save time, trouble and trees.

With a variety of fax servers to choose from, you need to consider several issues. How easily can the software be installed and managed? Is the user interface well suited to your users' competencies? Does the client software support the file types commonly used within your organization?

Can you administer the flow of incoming and outgoing faxes easily, and can you set up cost-accounting structures?

We considered all of these issues when testing the only two NetWare Loadable Module (NLM)-based servers on the market — Cheyenne Software, Inc.'s FAXserve and Castelle's FaxPress.

Castelle licenses Ahaus, Germany-based Tobit Software's FaxWare, which is identical to FaxPress.

We installed both products on a NetWare 4.1 server and ran their client portions on Windows 3.1 platforms. Both also support DOS and Win-

dows 95 clients (see Figure 1). FAXserve was the clear winner in this two-product race, sporting an intuitive user interface as well as a solid Windows-based administration program that lets any designated user manage incoming and outgoing faxes easily. It also supported a wide array of file formats for fax attachments.

FaxPress, on the other hand, fell short in several areas. Our biggest obstacle — and greatest source of frustration — turned out to be the software installation and configuration. We discovered the product didn't always support the specific modems and fax boards Castelle said it did. We alternately configured FaxPress with a GammaLink CP board and a Microcom Corp. Deskport Fast 28.8K bit/sec external modem. Both options were on the list of supported devices, but neither worked properly at all times.

Beyond these technical glitches, FAXserve does not support NetWare Directory Services; you must enable bindery emulation on a 4.1 server. Its file-type support for attachments is limited to ASCII, PCX and BMP. We were also a bit put off by FaxPress's client interface, which makes use of a clumsy command mode that harkens back to older DOS-based interfaces. FaxPress also lacks an administrative client, requiring that many tasks be performed at the system console.

## NetResults

Product	FaxPress NLM Version 3.10	FAXserve for NetWare Version 3.01
Vendor	Castelle (408) 496-0474	Cheyenne Software (800) 243-9462, (516) 484-5110
Price	\$595 — 5-user license \$295 — each additional 5 users	\$595 — 5-user license \$3,995 — 100-user license \$7,995 — 500-user license
Pros	▲ Flexible accounting/billing	▲ Supports NDS mode ▲ Client-based server administration
Cons	▼ Does not support NDS mode ▼ Lacks a client-based administrative tool ▼ Cumbersome command-code language ▼ Poor documentation	▼ Limited accounting/billing

FaxPress is suited to smaller networks of about 50 users, while FAXserve is more scalable and can handle larger networks.

### Installation as easy as N-L-M?

Because both packages run as NLMs, we were optimistic that installation would prove easy and uneventful. But that turned out to be only half the story — the Cheyenne half.

FAXserve was a snap to install and configure. It supports a generous number of internal fax boards, external Class 2 modems and ISDN boards. We did most of our testing with a GammaLink CP internal fax board, but we also went through the exercise of configuring FAXserve with a Microcom Deskport Fast external modem and found that setup worked well. Once we completed the actual installation, we only had to load the FAXserve NLM at the server console to get the fax server up and running.

FAXserve also comes with a separate client-based utility, Config Pro Exec, which verifies your configuration and notifies you of any problems.



Figure 1: FaxPress's Windows client allows users to monitor the progress of their faxes and view incoming faxes that have been routed from the server.



In contrast, we encountered numerous snafus with the FaxPress server. After going through the installation and configuration procedure — again, we used the GammaLink CP internal fax board — we brought up the FaxPress server, which was a multistep process. First, we had to load a Transport Layer Driver (TLD) NLM for each telephone line previously configured. In this case, we only configured one line, so we loaded a single NLM, TLD01.

Then we loaded the FaxPress NLM. So far so good, though we suggest that Castelle (or Tobit) find a way to consolidate these separate steps into one load procedure.

The problems surfaced when we discovered that although we could send faxes using the GammaLink board, all incoming faxes were converted to garbage. We called technical support, expecting to receive a quick fix since the GammaLink board was one of the supported choices on the configuration menu. Instead, we were told that this was a known problem and that the company was working toward a solution. Though it's been several weeks, we have still not received a fix.

We then switched to the Microcom external modem. The driver provided by Castelle was incapable of correctly initializing the modem, but we found that for the most part, we could still send and receive faxes. However, on several occasions, we ran into difficulties and had to reload the TLD several times to correct the problem.

#### Managing it all

Castelle's FaxPress lacks a separate client-based administration tool, so you must perform most management and configuration tasks at the NetWare server console by scrolling through pop-up menus. From the console, you can authorize FaxPress users, enable inbound routing, create routing databases and view log files.

One of FaxPress' strongest features is

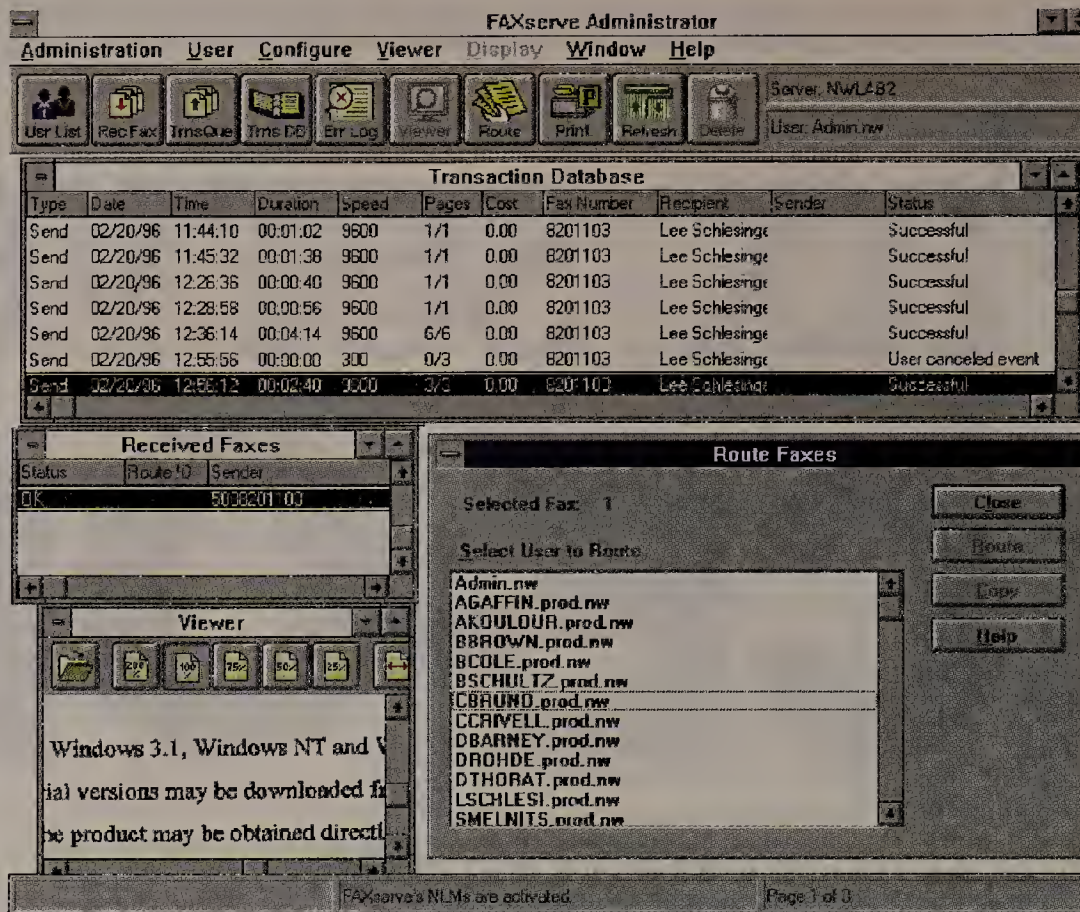


Figure 2: FAXserve Administrator, a client-based application, lets you configure and manage the server. You can authorize users, set up routing algorithms or manually route faxes through this Windows utility.

its charges table, which allows you to assign pricing structures to outgoing faxes. Because FaxPress is a German product, the charges table and the description in the documentation reflect the peculiarities of the European tariff structure. Nonetheless, the table can be adapted to handle local, long-distance and international tariffs in the U.S. and other countries.


Blacklisting is another feature that sets FaxPress apart, enabling you to put together a list of restricted phone numbers. FaxPress will reject any attempts to send faxes to these blacklisted numbers. While that may be useful for some, it would also be nice to be able to blacklist some incoming faxes, such as those sent each week from the restaurant down the street.

FAXserve offers FAXserve Administrator, a more sophisticated Windows-based management application that allows you to perform all management and configuration tasks from a client (see Figure 2). It's a well-constructed interface that allows you to configure the fax server, authorize users, and view and route faxes.

FAXserve's accounting feature, however, is not as robust as FaxPress's. Instead of using rate tables to replicate existing domestic and international tariff structures for a truly accurate picture, FAXserve allows you to assess per-page or per-minute charges. This may be useful for some sites but does not reflect the true costs of faxing.

#### End routing

These servers also allow you to make some choices about what to do with incoming faxes. You can send them directly to a printer, or you can institute inbound routing algorithms to channel some or all faxes to designated users entered in routing databases on your network.



Get tips on reducing your enterprise fax costs on Network World Fusion.

<http://www.nwfusion.com>

Select NetRef, Buyer's Guides and Reviews, then Fax Servers.

Nonetheless, you or a designated individual will likely be called on to manually direct some of these faxes. Why? Because none of these routing algorithms accounts for all of the possibilities.

Castelle, however, offers more routing options. With FaxPress you can route all faxes that arrive through a particular line to a designated account on the network — a useful feature in a multiline setup where each line is designated to a department in your organization.

Dual-tone multifrequency (DTMF) routing is also supported. Under this scheme, the sender must tack on a four-digit code to the end of the phone number. When the fax is received, the code is looked up in a database to determine where to route the fax.

You can also route faxes by calling station ID (CSID), the fax number identifier associated with the sender. FaxPress can even learn the CSID of an incoming fax and then route all faxes with identical CSIDs to a particular user in the routing database. This might be useful, for instance, in automatically routing faxes from clients to their account managers.

Of course, this system is not foolproof and makes two assumptions that will not always hold true: First, not everyone programs a CSID for their fax machine or server, and second, there may be cases where one routing path for a particular

CSID is not feasible. Still, for some organizations, CSID routing may be useful.

You can also manually route after one of the above methods has been implemented. So, for instance, you can route all faxes that come in on one line to a particular user. That user can then manually route faxes to others in the organization.

Cheyenne's FAXserve offers DTMF and line ID routing but not CSID. FAXserve also supports manual routing through FAXserve Administrator. Unless automatic routing has been enabled, all faxes are directed into a Receive queue, which can be viewed through FAXserve Administrator. An administrator then routes faxes to their intended recipients. There's also a Copy option that allows an administrator to route a copy of the fax, which is useful if one fax needs to be routed to several recipients. Cheyenne has even built in a measure of confidentiality — FAXserve administrators may view only the first page of any incoming fax.

#### Faxes away...

Each package provides basic send capabilities as well as the standard accoutrements, such as cover sheets, signature files and phone books. In addition, both packages allow you to exercise a measure of control over faxes. For instance, you can broadcast a single fax to multiple destinations, and you can assign fax transmissions to specific time slots. So if a cross-country or international fax transmission is not particularly time-critical, you can schedule it to take advantage of nonpeak phone rates.

Both packages allow you to fax from most Windows-based applications, but FAXserve goes a step further. It provides prepackaged macros for several applications, including Microsoft Word and Excel, allowing you to fax from applications without having to go through the Print menu option. FAXserve is also Message Handling Service (MHS)-compatible.

### HOW WE DID IT

We installed Cheyenne's FAXserve for NetWare Version 3.01 and Castelle's FaxPress NLM Version 3.10 on a NetWare 4.1 server with 32M bytes of RAM. We installed the client software on 486 PCs running Windows 3.1.

First, we tested the NetWare Loadable Module fax servers by sending text and graphics files. We sent faxes from within a variety of Windows applications as well as through the fax client software.

Next, we evaluated the ability of each server to receive faxes, looking at the various routing algorithms.

Finally, we spent considerable time looking at the administrative capabilities of each package. We were interested in how easily we could configure and manage the server — authorizing users, setting up routing databases and implementing accounting/billing functions.

— Stuart Melnitsky











ble and can send electronic mail messages as faxes if the right codes have been inserted.

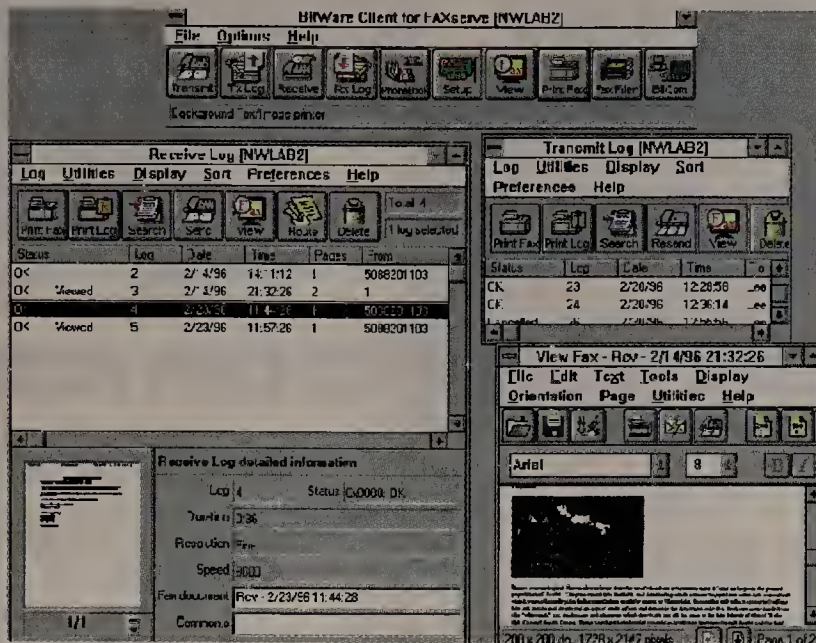
As part of our testing, we opened a variety of Windows-based applications — word processing, spreadsheet, database and presentation — and faxed text and graphics without encountering any problems. Both FAXserve and FaxPress generated high-quality faxes, exceeding the quality of faxes transmitted from one paper-based fax machine to another.

The ability to send faxes from within applications is undoubtedly crucial, but it's only part of the picture. Without the ability to track the progress of their faxes to ensure successful transmission, users in your organization will likely return to their traditional facsimile machines, where they can receive the immediate gratification of feeding their documents through the scanner.

With this in mind, we also looked at each product's Windows client interface. Cheyenne's BitWare is flexible and allows end users to view log files for incoming and outgoing faxes to verify their faxes went through (see Figure 3).

Through the BitWare client, users can also combine different documents into a single fax transmission, send simple text-based faxes, view incoming and outgoing faxes, and maintain phone books. An administrator can set up a public phone book for networkwide use, while users can simultaneously create their own phone books from scratch or import existing phone books from other applications. BitWare supports dBase III/IV, ASCII and WinFax Pro formats.

FAXserve also offered a couple of useful features not duplicated by FaxPress. We particularly liked its attachment menu option, which allowed us to combine a bunch of different files into a single fax



**Figure 3:** FAXserve's BitWare client lets users perform a variety of tasks, including viewing log files, managing phone books, and viewing and printing faxes. BitWare also lets users combine different files into a single fax transmission.

transmission. BitWare supports a host of file formats, though PostScript was conspicuously missing from the list.

The FaxPress client, on the other hand, is not as full-featured. Like Cheyenne's BitWare client, it provides transmit and receive logs and allows users to view incoming and outgoing faxes, send simple text faxes and maintain phone books, though importing existing phone books is not easy. FaxPress will only import text-based files constructed according to rigid guidelines. For instance, an entry must contain the fax number and name of the recipient separated by a semicolon.

The FaxPress client also uses a somewhat arcane command-code language — more than 50 commands — that will undoubtedly prove too cumbersome for many users. Fortunately, you will be able to avoid having to delve too deeply into this realm if you stick to faxing from within Windows-based applications. But there will be occasions when the command mode will be unavoidable. For instance, appending graphics or text files to simple text faxes requires you to insert the appropriate commands, which must be preceded by "@@" the code for

enabling the command mode.

FaxPress also comes up short in the area of attachments. It only supports PCX, BMP and ASCII file formats.

FaxPress offers a utility for transferring binary files between two servers running FaxPress, but in this age of E-mail file attachments, this isn't a strong selling point.

#### Incoming!

On the receiving side, we defined five general criteria for our evaluation: inbound routing, viewing, forwarding, printing and filing. Both products, to some degree, satisfy these criteria.

FAXserve received everything we threw at it, regardless of origin — fax server or facsimile machine. FaxPress also performed well, though as mentioned earlier, we had to switch our modem device because all inbound faxes were transformed into garbage when we used the GammaLink board.

Neither package comes with optical character recognition software, but they do provide viewers to display and manipulate faxes. Images can be enlarged or reduced to thumbnail size if desired. FAXserve offers several additional features, such as antialiasing to clean up the appearance of faxes and an annotation tool that allows users to mark up faxes.

FAXserve also allows users to set up automatic forwarding through the BitWare client. So if a user is out of town, FAXserve can be set up to forward faxes to a different number. The only problem with building this feature into the client software is that someone at the home office must ensure that the client is up and

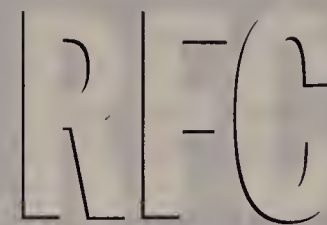
running. FaxPress doesn't offer this feature, though it is possible to forward faxes from the server on a case-by-case basis. FAXserve also allows users to forward faxes via E-mail.

#### The last word

If you're a believer in NLM solutions, Cheyenne's FAXserve, with its robust administration capability and polished client interface, is the better choice. Future reviews will look at shared dedicated fax servers and at fax services for Windows NT — two other options for network-based faxes. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 39.

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#### Request for Comment

The Network World Test Alliance will be conducting further tests of fax servers in upcoming issues. We plan to look at both stand-alone network fax servers and products that run as Windows NT services. Vendors or readers with suggestions for products to test should contact Test Center Director Lee Schlesinger at [lschlesi@nww.com](mailto:lschlesi@nww.com).

#### FAXWARE RELABELED

We received and evaluated a copy of Tobit Software's FaxWare and found it identical to FaxPress. Castelle added no new features.

## IP over ATM

Continued from page 42

tion," says Larry Lang, vice president of product management at Ipsilon who, until a few weeks ago, was Cisco's director of ATM product marketing. The ATM Forum is working to standardize this mapping, although there is no time frame for when that work will be completed. Nonetheless, Lang says Ipsilon will implement RSVP to ATM QoS mapping on its switch by the end of this summer.

In the meantime, the only way to set up QoS on an ATM network is to write applications to one of several proprietary APIs that make ATM calls (see story, page 42).

For QoS to work properly, however, all devices and systems involved in the end-to-end circuit, at all layers of the International Standards Organization model, must take part in negotiating the parameters for each session, says Mary Petrosky, a senior analyst at the Burton Group, Inc.

consultancy in San Mateo, Calif.

That means you are headed for trouble if you need to balance end-to-end ATM applications such as desktop video against IP-based traffic requirements, because IP cannot participate in those QoS negotiations.

If, like McDonald's, you are in the early stages of deployment and are using the ATM backbone primarily as a fat pipe for LAN-based traffic, then you've got time to wait for the vendors to hash out QoS issue. McDonald's has no desperate need to deliver ATM all the way to the desktop, Rush says, and only 1% or 2% of its user population has applications that could use QoS — for now, at least.

"Things change so fast, once we make [end-to-end ATM] available, everyone will want it," Rush says. "So those of us who are network designers have to make sure the architecture is flexible enough to accommodate them rapidly."

Take warning, however: Migrating

from a router backbone to full-fledged ATM with QoS — as opposed to the simpler 155M bit/sec fat pipe — can inflict severe culture shock, not to mention a few all-nighters.

"In traditional IP data networks, you don't do engineering — you wait until someone complains [about response time] and throw in more bandwidth, maybe by moving to FDDI or whatever," Lang says. With QoS, however, you need to consider questions like, "What traffic patterns will come up? What is the holding time on reservations, and how much bandwidth [does a given device] need to reserve? I ask users these questions and they don't know the answers," he says.

"ATM promises a lot of bandwidth, but if your network is poorly designed, your users will eat it up quick," Rush says. "Just saying, 'I wrote this application, just give me more bandwidth to run it' becomes an expensive option, [particularly over the WAN]. So cooperation between applica-

tion people and network architectures becomes imperative."

Fortunately, net monitoring tool vendors and the switch vendors themselves are beginning to provide tools to collect application-specific traffic and performance data across ATM nets in order to pinpoint, and hopefully proactively deal with, incipient bottleneck problems.

Such tools will be important because penalties for making the wrong engineering choices will tend to be much higher once users start employing QoS widely to support multimedia traffic, Lang says. "The typical complaint on today's data networks is 'It's too slow.' If QoS isn't properly engineered, the complaints will be, 'I can't get through.'"

No wonder ATM implementors are taking things slow and easy.

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# Management Strategies

Covering: Career Insights and Innovations  
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## Briefs

■ Computer-based training firm **MindQ Publishing, Inc.** is teaming with system integrator and Java training provider **Rapid Systems Solutions, Inc.** to produce instructional CD-ROMs for first-time Java developers.

Rapid Systems will provide content, while MindQ will create and distribute the CD-ROMs.

The first CD-ROM is scheduled to ship next month and will include the latest Java development kit from Sun Microsystems, Inc., documentation for Java development and 100 sample Java applets.

MindQ: (800) 646-3008; Rapid Systems: (410) 312-0777.

■ The Yankee Group has agreed to take part in the **Inter-Act '96** virtual conference being held on the World-Wide Web April 23-25.

Howard Anderson, the firm's managing director, will deliver a keynote address on how the Internet devours existing business models, while Yankee Group consultants will offer insight on emerging Internet technologies.

Visit <http://www.interact96.com> for more information.

## CNEs cram for recertification exam

By Ram Tacket

The mad dash is on for more than 30,000 Certified Novell Engineers (CNE) who are at risk of being stripped of their titles by Novell, Inc. on June 30 under new program rules aimed at pumping up the value of Novell certification.

Even as this last batch of the more than 78,000 CNEs rushes to recertify, many trainers and hiring managers still question whether earning a CNE is a replacement for real-world experience.

The new rules, adopted last May, require existing CNEs as well as CNE candidates to pass one of two new tests — NetWare 3.X to NetWare 4.X Update or NetWare 4.X Administration — to keep or earn their CNE designations. Those tests are designed to demonstrate proficiency in using NetWare Directory Services, a key building block that enables users to construct enterprise LANs using NetWare 4.X.

The new requirement is part of a Novell effort to increase the value of its ballyhooed CNE program by making tests harder and more focused on specific NetWare functions. Novell gave users that obtained the more advanced Enterprise CNE title a deadline of Feb. 14, 1996, to pass its Fundamentals of Internet-work and Management Design

test to become Master CNEs.

ECNEs who missed the deadline were decertified and must go through the entire Master CNE program to earn the title. The Master CNE program has something the ECNE lacked — a requirement for users to special-

information about their existing network and calculate a return on investment for CNE training (seestory).

An informal survey conducted by Novell during its BrainShare '96 conference last month indicated Novell certification is an important career step for staffers.

Of 90 managers polled, 71% say finding out if a candidate is a CNE is a criterion in their hiring decisions. Another 51% say being a CNE affects pay-raise decisions, while 38% indicate Novell certification is a criterion for giving promotions.

But not everyone concurs with BrainShare attendees on the value of the CNE title.

"Unless you are a CNE or are pursuing a CNE, you may not be interested in or even

know about the changes," says Matt Smith, an instructor with Astron, Inc., a network training firm in Provo, Utah. Most employers are concerned with acquiring and retaining quality network support personnel but may not have the time to keep up with these types of changes, he says.

"Novell has indeed made its

CNE tests significantly harder and longer," Smith says. "But the tests still require people to be more academically oriented."

Smith does tip his hat to Novell for adding some questions in its tests that ask CNE candidates to overcome simulated network problems. "Simulation questions on the tests are a real step in the positive direction. These help you gain a little understanding of a person's real-world experience."

But there is no surefire way to teach the skills gained from real-world experience in a CNE course, Smith says.

"There's absolutely no substitute for a trial-by-fire experience," he says. "That's the real test of a person's ability. I think the CNE shows aptitude. Coupled with four or five years of experience, the CNE is powerful. But the CNE by itself is not a substitute for experience."

Others agree. "You can't teach analytical and logic skills in the CNE program," says Bob Harbison, president of Network Integration Consultants in Sausalito, Calif. "The weakest link in the program is the lack of troubleshooting skills that real-world experience brings a person."

Still, Novell is on the right track with the new requirements, says Gary Clark, Novell's director of certification and authorization programs. Clark says that prior to the changes, the CNE program did not require users to have a strong understanding of particular Novell products. For instance, employers with NetWare 4.X networks could interview CNEs who lacked practical knowledge of the product.

James Del Monte, president of Houston-based staffing firm JDA Professional Services, Inc., says getting CNEs to focus on specific expertise reflects changes in hiring practices.

"The reason for this is that Novell has produced a lot of CNEs who have never installed a network or have no troubleshooting experience outside of the classroom," Del Monte says. "The real world doesn't operate that way."

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Visit Network World Fusion

(<http://nwfusion.com>). Select Careers then CNE for links to Novell's education Web site where you can:

- Download a copy of the Novell Authorized CNE Advisor (a 1.8M-byte file)
- Find out more about what's required to retain your CNE
- Read how to become a Master CNE
- Search Novell's on-line course catalog

ize in one of three areas: Network Management, Infrastructure and Advanced Access or GroupWare Integration.

Last week, Novell also started shipping a free software program that extols the financial benefits of putting network staff through a CNE program. The Novell Authorized CNE Advisor enables managers to plug in

## Program calculates CNE payback

If you are wondering whether it will be worth the dough to put your staff through Certified Novell Engineer (CNE) training, Novell, Inc. has something for you.

The firm is giving away a Windows-based program called Novell Authorized CNE Advisor as part of its grand plan of getting employers to view CNE-trained staff as more valuable. The program calculates the return on investment you will get by certifying your network support team.

The package includes background information about Novell's various educational programs as well as a detailed look at the requirements that must be met to earn the title.

But the key part of the program is a financial analysis model that asks managers to enter information about their current and future network setups. In return, it spits out tables and charts that estimate how much you can save by increasing the number of CNEs on staff.

You plug in data for the number of servers and

clients in your networks, as well as estimates for future changes in those numbers. Then you enter information about the number of calls made to support staff, the average length of each call and the hours of network downtime per week.

The number of CNEs on staff and an estimate for how many are being brought on board is supplied next. Then you enter revenue projections.

The collected data is passed through a series of formulas based on research from International Data Corp. and Strategic Research Corp.

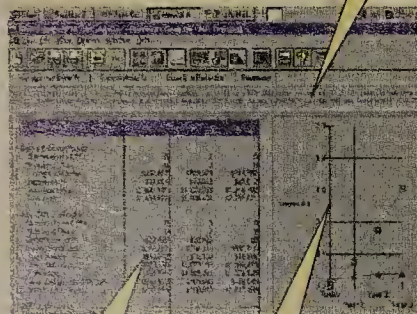
The engine used to process the formulas was developed by Interpose, Inc., which produces the C/S Solution Advisor financial modeling tool for NetWare networks (NW, Nov. 13, 1995, page 83).

The Novell Authorized CNE Advisor can be downloaded from Novell's World-Wide Web site and will be distributed through Novell Authorized Education Centers worldwide later this month.

Novell Education: (800) 233-3382.

—Jim Brown

A summary box tells you what assumptions can be made based on the analysis.



The table gives you a peek at how the network setup and staff parameters change over time to produce savings. The same information is plotted on a graph.

Novell's Authorized CNE Advisor adds up the operational savings gained from the expense of CNE training.



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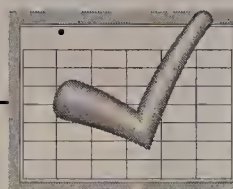
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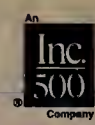
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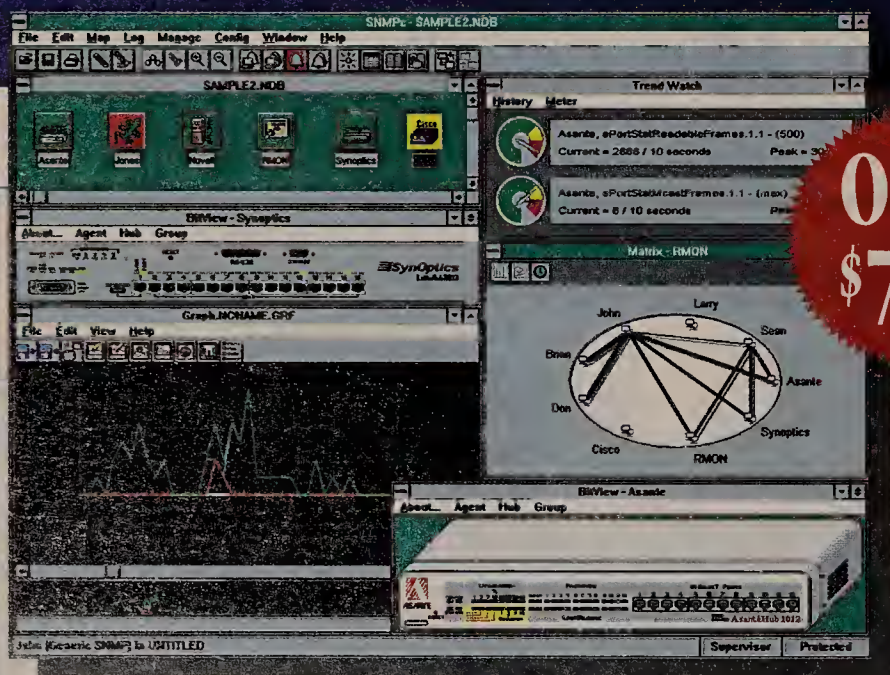
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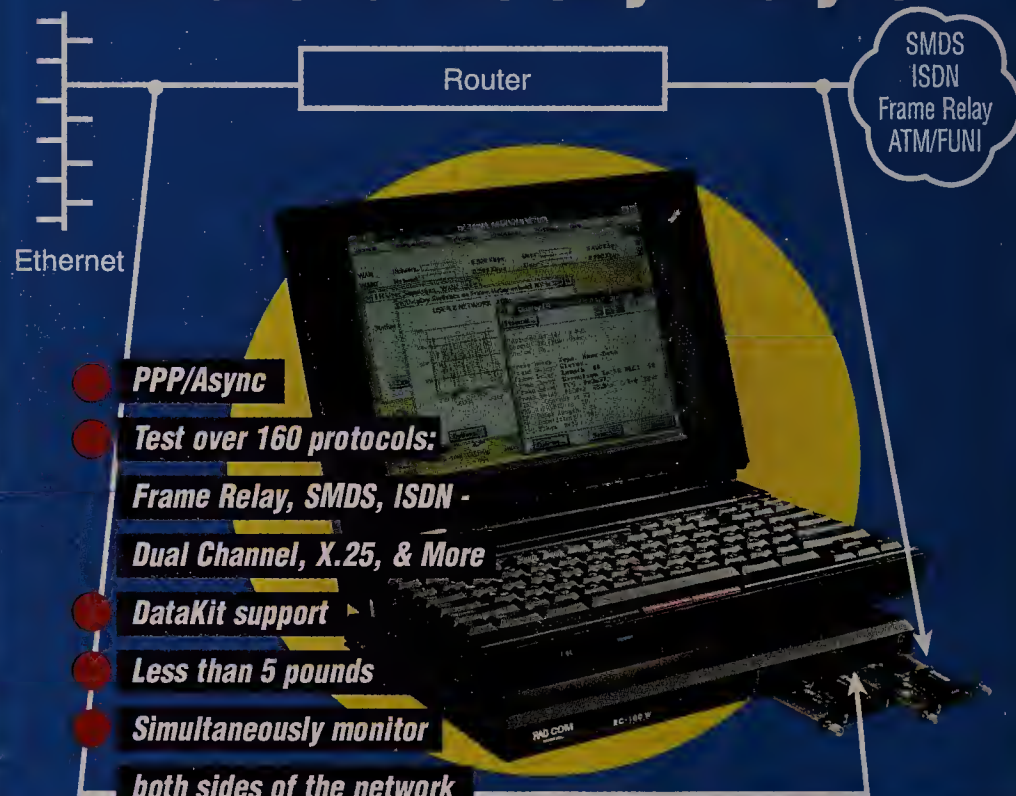
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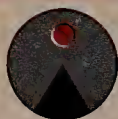
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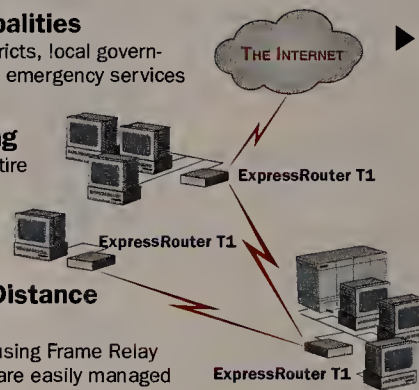
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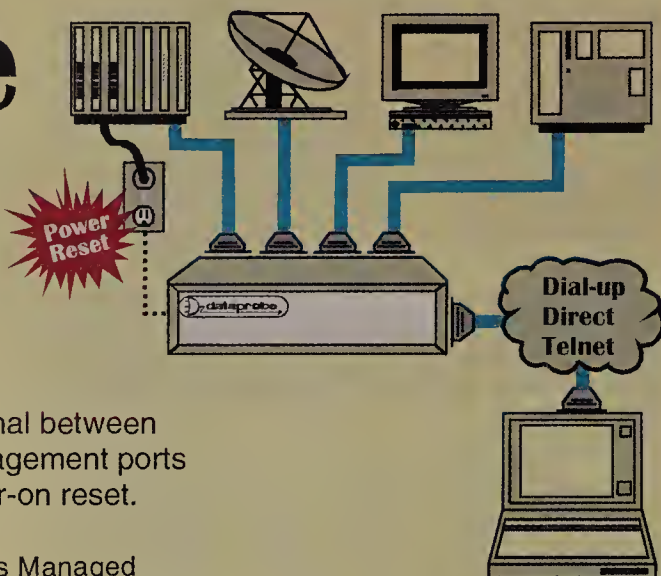
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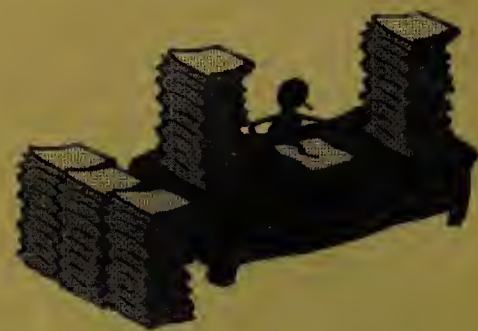
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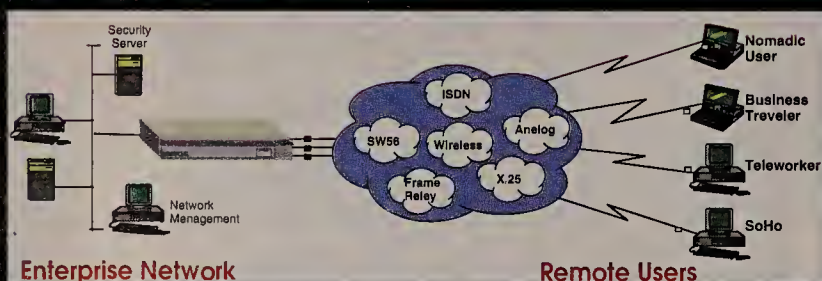
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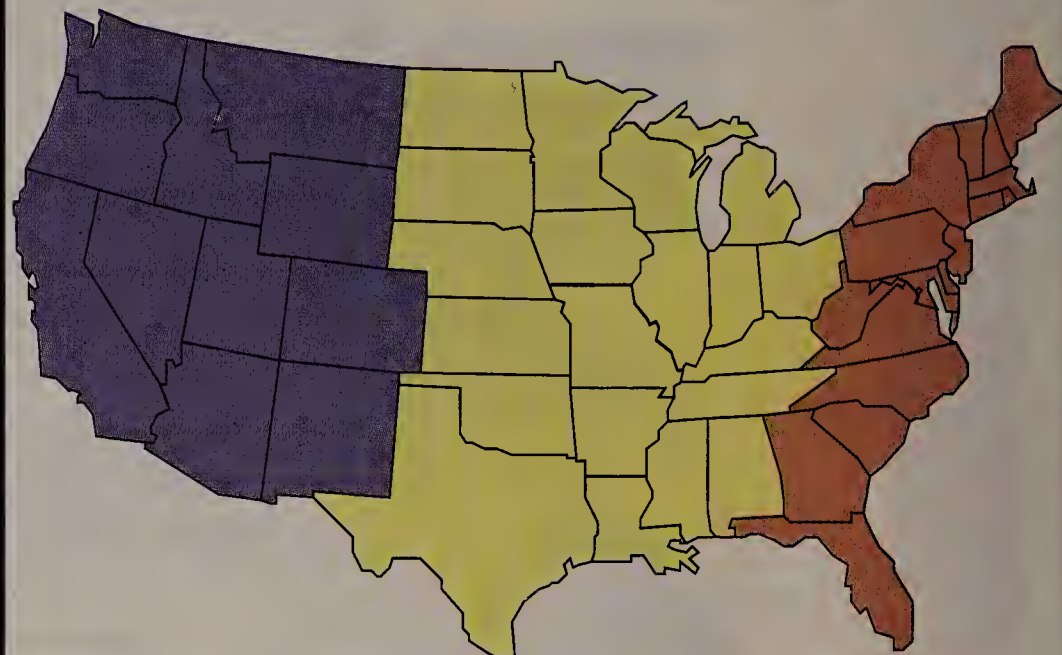
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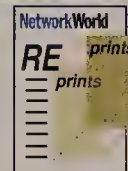
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## MCI

*Continued from page 1*

day turn-up time after putting in his order. But late last month, he was told the service would not be available until the end of June.

Likewise, ISP Northwest Nexus, Inc. of Bellevue, Wash., placed an order for Internet access with MCI in March, but it must wait until June for a T-1 connection, according to Ralph Sims, the ISP's vice president.

Having to wait "wouldn't be acceptable to most customers, but because of redundancy in our network, we can work with it," Sims said.

News of MCI's customer lock-out followed reports that Sprint Corp. is filtering certain addresses off of its backbone to alleviate a problem with router table entry saturation (NW, March 25, page 25). Figuring out a way to deal with 'Net traffic jams is on the minds of many carriers as projections for customer demand continue to soar (see graphic, page 1).

Sims said the Internet is getting loaded to the point where

each ISP must exercise responsible management over its section of the 'Net — such as by recycling unused blocks of addresses. Some ISPs getting into the business are not necessarily savvy about network management and router table configurations, he said, and that could have a ripple effect throughout the 'Net.

Robert Hoquim, president of IQUEST, Inc., an ISP in Indianapolis, said that, in general, "it is becoming common for parts of the country to go down for 30 minutes — it could be a router crashing or a major trunk outage that takes out five or six states."

In fact, the MCI backbone last Tuesday suffered a 30-minute outage in geographically dispersed locations as MCI adjusted its router at a Sprint Network Access Point to accommodate the 155M bit/sec upgrade.

Hoquim said he respects MCI for not trying to shoehorn new customers onto the network until it can reliably accommodate them, an MCI spokeswoman said.

"It would be stupid to put

more cars on the interstate when you already have bumper-to-bumper traffic."

But others feel MCI should have let them know earlier that it would have trouble filling their orders.

By the time MCI told him his T-1 line would be delayed, Anderson had bought a router, data service unit, a server and a bank of modems to start up his ISP business.

He could not wait until June to get an Internet connection from MCI, so Anderson bought a circuitous string of connections that linked him — via local carrier General Telephone Co. and interexchange carrier LCI International, Inc. — to a regional ISP in Columbus, Ohio.

Despite such inconveniences, some try to keep 'Net saturation hysteria at bay.

"There is congestion on the 'Net, but all the talk of imminent collapse is overblown," said Eric Paulak, research analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn. "Even the phone system still has outages." ■

## Java

*Continued from page 1*

remote Method Invocation (RMI) code will be essential in making Java a language for distributed applications. Today, developers can build stand-alone applications in Java and run them either on an application server or, more typically, on a Web server.

The problem is that for the downloaded applet to work with server-based Java objects, reams of low-level code have to be manually written. With RMI, Sun is handing to developers, in effect, a ready-to-use system that re-

## JAVA: FILLING IN THE BLANKS

**As a young technology, it is not surprising that Java is missing a few things. Here's how Sun plans to plug the gaps.**

- ▶ Deliver RMI, to ease the building of distributed Java applications, this year.
- ▶ Allow these distributed applications to work across corporate firewalls. Sun did not disclose a delivery schedule for this feature.

places all that code.

"If RMI had existed when we were writing our Java application, it would have saved us a lot of work," said Barry Burke, director of strategic planning at Applix, Inc., a Westborough, Mass.-based vendor of real-time applications and tools. "It implements client/server Java applications over the net."

Applix created a Web browser-based Java front end to its server-based real-time spreadsheet.

The company's Applixware server runs all the spreadsheet calculations, which are displayed through the downloaded Java client. It is this kind of interaction, with application functions handled by different computers, that Java RMI is designed to facilitate.

A pre-beta developers' release of the RMI tool kit is available at <http://java.sun.com/>. The final release is expected at year-end.

## Objects everywhere

Java RMI is the second of two distributed object mechanisms Sun is creating for Java. The first, announced a few weeks ago and called Joe, is an ORB written in Java that works with Sun's Neo ORB on servers. Joe creates a connection based on the Common ORB Architecture standard between Java objects and Neo-based applications written in C or C++.

However, Java RMI works without an ORB, and without the attendant programming and infrastructure complexities, according to Eduardo Pelegri-Llopert, staff engineer with Sun's Javasoft group.

Instead of using a naming service to locate remote objects, RMI relies on the Web's URLs to provide the requesting object with the necessary information, according to Pelegri-Llopert.

As a result, RMI creates a simple and efficient programming model for distributed Java applications, said Patrick Naughton, a Javasoft founder and now senior vice president of technology at Starwave Corp., a Bellevue, Wash.-based publisher of interactive entertainment systems.

But RMI, as yet, will not work across a corporate firewall. "This is a serious lack," said Sam Pendleton, senior member of technical staff at Cadis, Inc., a Boulder, Colo., developer of an advanced database search engine. "This capability must be there."

A Javasoft spokeswoman said several solutions are being studied, but a release schedule has not been decided yet. ■

## ServerNet gaining acceptance?

Compaq Computer Corp. officials said they needed to "evangelize" the ServerNet hardware and software interconnect technology they licensed from Tandem Computer Corp. last year.

It may be working. Sources say Unisys Corp. will be the next Intel-based computer maker to line up behind the technology. Unisys and Tandem, however, would not confirm any agreement.

And Hewlett-Packard Co. may not be far behind. "We're seriously looking at it just like everybody else is," said Maureen Mellon, HP's net server division marketing manager.

ServerNet is a switch-based software technology developed by Tandem that is capable of sending data through a server using peripheral components. Data types such as video, images and voice information that do not require processing are routed around the CPU or memory.

Acceptance of ServerNet by the industry is significant for Compaq because it will make it more likely that the company's software APIs for clustering will be included in an upcoming clustered Windows NT implementation, due in 1997. Without inclusion of those APIs, ServerNet would be a proprietary means of clustering standards-based Intel servers. Though there is a lot of industry buzz over interconnect schemes such as ServerNet and Memory Channel Interconnect (see story, page 1), the major Intel-based vendors say they are waiting for Microsoft. Engineers at the Redmond, Wash.-based firm have yet to complete a version of NT optimized for a clustered environment and corresponding applications.

Jim Boak, Compaq's director of solutions engineering, said the firm is also researching other interconnect technologies. Meanwhile, David Nichols, IBM's director of worldwide PC server strategy, said IBM would soon offer several solutions to its customers.

— Ben Heskett



One option for companies searching for flexible clustering options is Tandem's ServerNet technology. HP's Mellon (left) is looking at it; IBM's Nichols is keeping his options open.

## Digital

*Continued from page 1*

veil a version of the Oracle Parallel Server (OPS) database that is optimized for TruClusters. Through a layer of clustering software, OPS can distribute a database query through memory across multiple nodes in a transparent fashion.

Digital will offer a TruCluster bundled with OPS.

One analyst said OPS running on a TruCluster will "blow the doors off" previous database performance standards.

Digital also will announce a layer of software that has hooks into Digital Unix and provides failover capabilities and performance enhancements for applications running across a cluster.

But the key to TruClusters is memory interconnect, experts said.

"It's going to be a very cost-effective approach to handling problems bigger than a single machine can handle," said Dan Kusnetzky, an analyst with International Data Corp. in Framingham, Mass.

For users, the most appealing promise of clustering is availability, according to Jonathan Eunice, an analyst with Illuminata, Inc., a Nashua, N.H.-based consultancy. In a clustered environment, if one server fails, another server can pick up the process without skipping a beat. Performance gains also make

clustering attractive. Multiple machines working on processing improves throughput.

Digital declined to comment. Pricing information for Digital's TruClusters was not available.

## NT clusters, too

In the near term, Digital has raised the clustering solutions bar in the Unix world with the introduction of TruClusters, analysts said. But a Windows NT future may hold the most promise.

Analysts said Digital will use the memory interconnect with the clustering software on its Intel Corp. processor-based Priors servers running NT. So clustering APIs in NT will work with Digital's software layer.

NT Intel-based clustering is tied directly to the machinations of Microsoft Corp. engineers on Wolfpack, the code name for a cluster-enabled version of NT that includes a set of APIs to which programmers can write.

A beta version was sent out recently.

A two-node failover cluster implementation based on Windows NT will ship from Intel-based vendors by the end of the year, after a module is added to NT 4.0. Digital, which has worked closely with Microsoft on a clustering spec, will announce a two-node failover cluster based on Windows NT on June 3.

Microsoft is planning to offer a multinode version of NT in 1997. ■



## Sun

Continued from page 1

links for the company's Ultra-SPARC workstations and servers, supporting applications such as interactive video and CAD/CAM.

While Fore Systems, Inc. is already shipping 622M bit/sec ATM switch-to-switch interfaces, Sun is first out of the gate with an OC-12 card that plugs into an endstation, according to industry observers.

Today's 25M and 155M bit/sec ATM adapters provide more than enough capacity for most environments, but there are customers eager to deploy the 622M bit/sec cards.

"We could use the 622M bit/sec NICs today in our server farms, which all collect into ATM backbone switches," said Jeffrey Marshall, senior managing

director of communication technologies at Bear, Stearns & Company, Inc. in New York. "We are using 155M bit/sec links now and are capacity-strained, so we are looking for the next step up in speed."

The new SunATM 622 adapter also appeals to John Dorl, director of systems and technologies in the radiology department at Johns Hopkins University in Baltimore.

"We're looking at getting our radiology images on-line — which entails sending gigabytes of data — and that opens up a lot of room for bottlenecks," Dorl said. "So 622M bit/sec can really make a big difference in the medical imaging arena."

But Thomas Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J., said that a 622M bit/sec ATM adapter is overkill for most customers.

"There is no significant number of systems today that output enough information to require 622M bit/sec," Nolle said. "And in many cases, the computer bus capacities are taxed at that level."

However, Nolle acknowledged that the SunATM 622 card would offer value for some specialized servers as well as some multimedia and supercomputing applications.

The SunATM 622 adapter is an Sbus card that works over multimode fiber. The card joins Sun's existing 155M bit/sec adapter, which can run on either multimode fiber or Category 5 unshielded twisted-pair cabling.

## ATM OVERKILL?

**The highest credible data bandwidth requirement for a desktop system is about 14M bit/sec, according to the CIMI Corp. consultancy in Voorhees, N.J.**

In addition, the SunATM 622 card supports the ATM Forum's User-Network Interface 3.0 and 3.1 specifications and LAN Emulation 1.0.

While Sun is readying its 622M bit/sec ATM adapter card, the company is also pushing to develop a competing technology

to extend Ethernet to 1G bit/sec (NW, Dec. 18, 1995, page 1).

"In some cases, it will make more sense for servers to use the yet-to-come Gigabit Ethernet technology," said Forest Preston, Sun's ATM product-line manager. "If the server is on a self-contained Ethernet LAN, it would be inappropriate and unnecessary to introduce

another networking technology [like ATM] just to get more bandwidth to the server."

In general, however, Sun sees Ethernet for low-cost desktop connections and ATM for server and backbone technology.

The SunATM 622 adapter is priced at \$4,995 and will be available in June.

©Sun: (415) 960-1300.

## NetworkWorld

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## In-Site

Continued from page 1

Integrated Communications Network (ICON), involves one of the first big installations of the IBM gear.

"The driving idea behind our plans was to create a packet-switched wide-area network that would carry SNA and internet-worked TCP/IP, IPX and OSI protocols on a

voice, video and data traffic.

"We chose IBM Nways on the strength of its dynamic bandwidth allocation features and its ability to do circuit emulation [which lets the switch handle frame relay and ATM simultaneously] in ATM mode," Carayannakis said. "Ultimately, we want to end up with a private ATM net and the IBM boxes will let us do that."

The company

also toyed with the idea of implementing a pure router-based backbone with separate SNA gateways to the mainframe, but eventually chose the IBM switches, which integrate router and gateway functions in one box. "The other solutions appeared to be only stopgap, and we were looking more long term," he said.

## Three phases

Phase I of the ICON project involved standardizing on network equipment at the utility's remote branch offices scattered across Ontario.

Most of the sites now include a Bay Networks, Inc. hub, 20 to 50 workstations running Attachmate Corp. 3270 emulators, a NetWare server and a minimum of one 56K bit/sec frame relay link. There is also an interoffice electronic mail gateway Ontario Hydro developed in-house to handle internal mail.

Phase II of the ICON project involved installing the IBM switches and building the private frame relay backbone. In order to complete this phase, Ontario Hydro

installed more than 200 Netlink, Inc. OmniLink switches, which now feed the remote branch office LAN and SNA traffic onto the backbone.

The combination of the Nways switches and Netlink boxes has saved the greatest amount of money since it allowed the utility to disconnect nine remote 3745s and eliminate more than 200 circuits previously required to run the SNA net.

SNA traffic generated by the remote branches is funneled to three mainframes located in Ontario Hydro's data center here. LAN traffic is routed via Cisco Systems, Inc. routers to other branch and local offices throughout the province.

Eventually, the company would like to remove SNA traffic from its branch offices, Carayannakis said. "But SNA is still a critical requirement for some of our more critical business support applications, and we will continue supporting it where necessary."

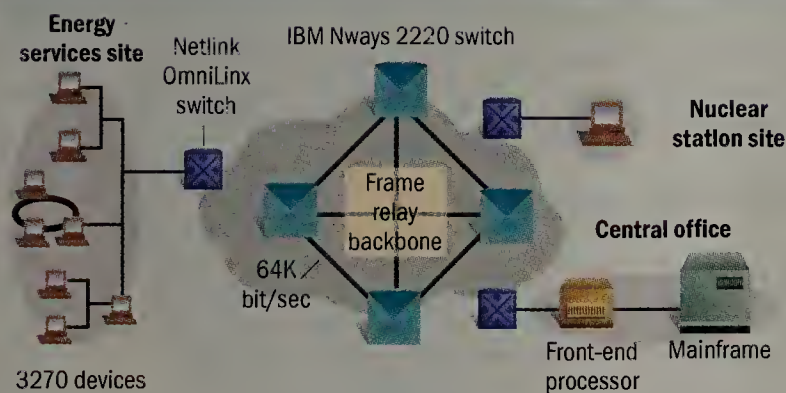
However, SNA is not the future for Ontario Hydro. The utility has invested heavily in client/server application software from SAP AG. In fact, three of its nine business units have already standardized on SAP software for such applications as tracking electricity usage systemwide.

"With our new applications, we can now get more information faster, which allows us to respond to customers quicker and more efficiently," Carayannakis said.

"Doing client/server over a WAN as large as ours was the most challenging aspect of ICON because of the bandwidth required; our backbone now enables those applications," he said.

ICON's third phase involves the move to ATM. "We think an ATM-based backbone will give everyone on the net the ability to exploit new client/server applications and allow the huge files PCs generate to easily traverse the backbone," Carayannakis said. "It'll give us the bandwidth and speed we'll need in the future." ■

## Ontario Hydro's Integrated Communications Network



The utility's network provides communications among remote sites and the data center. OmniLink switches convert SNA traffic into LLC2 frames for transport across the frame relay backbone along with native LAN traffic. The Nways switches — which will be upgraded to support ATM — can dynamically allocate bandwidth, giving certain applications priority over others.

GRAPHIC BY TERRI MITCHELL

common data transport," said Peter Carayannakis, a consultant with Ontario Hydro. "ICON could save us millions in reduced [software] licensing costs, applications development outlay, line charges and system administration."

The company is now about two-thirds of the way through the multimillion-dollar ICON project, which consists of a private frame relay net supporting 20,000 users at more than 143 sites nationwide.

The backbone is based on four IBM Nways 2220 switches, with five more Nways boxes to be installed as traffic increases dictate. In a year or so, the switches will be upgraded to support ATM and run a mix of



## Domain names and InterNIC Part 2: Trouble in them thar domains

**Y**ou may remember a column I penned a few months ago on the subject of Proctor & Gamble and the slew of Internet domain names it owns. It has snagged lots of sensible names, such as *aleve.com* and *hugoboss.com*, but it seems to be speculating on others such as *cleans.com*, *cleaner.com* and *cleanest.com*.

Proctor & Gamble also owns the domains *underarm.com* and *diarrhea.com* — which, as far as I am concerned, it is welcome to.

This is in direct contravention to the rules of the Internet Network Information Center (InterNIC). The column received no comment from either Proctor & Gamble or InterNIC. Either the two of them were embarrassed or simply didn't care.

My concern is that InterNIC is overloaded with work, extremely difficult to get hold of and as user-friendly as a cornered rat. On top of all this, it now charges for registration.

Curiously, the other day, my good friend Tony Miranda dropped me an interesting note on the same topic. His company, Protocol Telecomms, rents handheld radios to the organizers of events such as the Emmy Awards. Some of his best clients are in the film industry, and a vice president of Panavision is on his company's board.

Now you've probably noticed Panavision's name on films you've seen (the company rents cameras and handles film). Being a made-up name and in business for 30 years, Panavision has what is by any standard a "hard" trademark.

Last December, Tony was perusing the InterNIC registry database, when he found *panavision.com*. You guessed it: The domain doesn't belong to Panavision; it belongs to an Internet service provider (ISP) called Net66 in Champaign, Ill.

Needless to say, Panavision was somewhat miffed when Tony told them. Tony also found that Net66 had registered *arriflex.com*. Arriflex, a German company, is Panavision's only competitor. Do you see a pattern here?

Understand that Dennis Toeppen, Net66's president, claims the panavi-

*The problem is the Domain Name Service is a highly artificial way of naming things.*

sion.com registration was done for the town of Pana, Ill. That would have been believable except for that Arriflex registration.

Panavision's president is somewhat cross, and the company is in the process of challenging Net66's registration.

I checked out Net66 and discovered that Mr. Toeppen is the technical contact for more than 30 domains. That, in itself, is not so odd — Net66 is, after all, an ISP.

What is odd, however, is that so many of the sites are "under construction" and have names like *britshairways.com*, *deltaairlines.com*, *flydelta.com* and *catholicchurch.com*.

I can only theorize what Net66 intends for these domains; saying *britshairways.com* is for fans of the airline sounds ridiculous.

(Have you tasted BA's food? How could it have fans?)

The heart of the problem is the Domain Name Service — for all of its great attributes, such as it actually works and has scaled well — is a highly artificial way of naming things because it is inexact. For example, my company's address is *gibbs.com*, not *Gibbs & Co.*

Worse, InterNIC's administration is poor. Disputes over name "ownership," even for hard trademarks, are going to waste time and money unless InterNIC takes a real stand rather than the current weak "we don't want to know, you're on your own" policy.

First use and the misrepresentative application of trademarks are not vague concepts, and branding and trademarks are not trivial issues. But think of what Panavision will have to pay in legal fees just to get a case started to defend what it has owned for 30 years!

As for Panavision and Net66, who's your money on? More importantly, who do you think is right?

*Do you think InterNIC is doing a good job? Drop Gibbs your thoughts at [mgibbs@gibbs.com](mailto:mgibbs@gibbs.com), or call (800) 622-1108, Ext. 504.*



**Mark Gibbs**

## Who wants another fight? I'm just a peacemaker

**I**t usually takes three people to engineer a fight in this industry: two vendors to brandish fists and a journalist to play it bigger than life. An editor can really crank the volume with a bold, juicy headline.

That's why I was dubious last month when a Microsoft Corp. public relations guy breathlessly accused IBM of attacking its SNA Server product. "We have no other choice than to expose their insecurity and unsubstantiated marketing," he said. "This is war."

Microsoft is hardly an innocent bystander when it comes to marketing wars. The \$6 billion software giant is a ferocious, aggressive marketer. Like a rebel street fighter from Brooklyn, Microsoft has never feared stomping on toes in its march toward world domination.

In this case, the alleged combatants are Microsoft's SNA Server product unit vs. the \$14 billion AS/400 division at IBM. At first, I felt sorry for Microsoft; this matchup seemed like a fly vs. a hippopotamus. I decided to investigate.

Microsoft claims IBM wants to thwart



**Dave Buerger**

*Like a rebel street fighter from Brooklyn, Microsoft has never feared stomping on toes in its march toward world domination.*

its effort to simplify AS/400 connectivity with the SNA Server gateway. As evidence, it points to an IBM marketing paper, "AS/400 Direct Attach vs. Microsoft's SNA Server, Point — Counterpoint."

(IBM acknowledged the paper but would not give me a copy. "We do not want to make this a big issue," said Kevin Corcoran, director of competitive marketing for IBM's Server Group. "It's used internally in our education program." Microsoft posted the paper with a rebuttal at [www.microsoft.com/sna](http://www.microsoft.com/sna).)

But this Microsoft nonsense about simplifying AS/400 connectivity is just a stalking horse for the real issue: SNA Server requires NT Server. If IBM persuades customers not to use SNA Server, it effectively blocks an NT inroad to the

huge installed base of AS/400s.

"They're attacking NT Server through SNA Server," complained Vesa Suomalainen, general manager of Microsoft's SNA Server product unit. IBM is portraying SNA Server as a "wolf in sheep's clothing," he said. Actually, it is. "SNA Server has always been a Trojan horse for NT Server," said Audrey Apfel, research director at Gartner Group, Inc. "It's a gateway with a mission."

The goal is to poach new NT business from the ocean of AS/400 users. That's where the big money is.

IBM has sold 360,000 AS/400s worldwide, which are accessed by 1.5 million terminals and 2.7 million PCs, according to International Data Corp.

Its strengths are 28,000 business applications, strong third-party support and the ability to scale its 64-bit architecture far beyond the capability of Intel Corp. servers running NT.

According to IBM, Microsoft has only 10,000 BackOffice installations running on-line transaction processing applications. AS/400 shops are a lucrative NT server and application market opportunity for Microsoft. Of course, IBM wants Microsoft and NT to stay out.

In an effort to keep them out, IBM has recently repositioned the AS/400, changing it from a transaction-oriented line-of-business applications processor to a general-purpose platform that can handle file, print, E-mail, fax and other services.

And IBM may have an odd card up its sleeve that it can use to trump Microsoft. Virtually all of the 28,000 AS/400 applications

are screen-oriented. So are applications developed with HTML for Web servers. A new AS/400 HTML gateway allows customers to port most of these 28,000 applications for use on intranets and the Internet, according to IBM's Corcoran.

This capability could be a gold mine for AS/400 users that want to adapt business-critical applications for use on intranets and for electronic commerce. It also would be a terrible blow to Microsoft, which is already struggling to shift its desktop orientation to the Internet.

How ironic if Microsoft's ploy to stir a fight backfires. Could be one time Microsoft gets a taste of its own medicine.

*Buerger is a networking industry consultant and writer in Atlanta. He can be reached at [dave@buerger.com](mailto:dave@buerger.com).*



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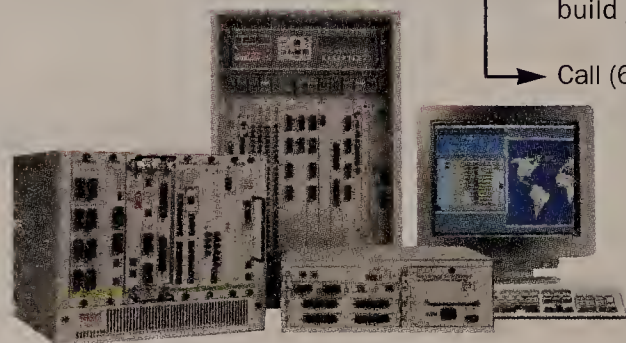
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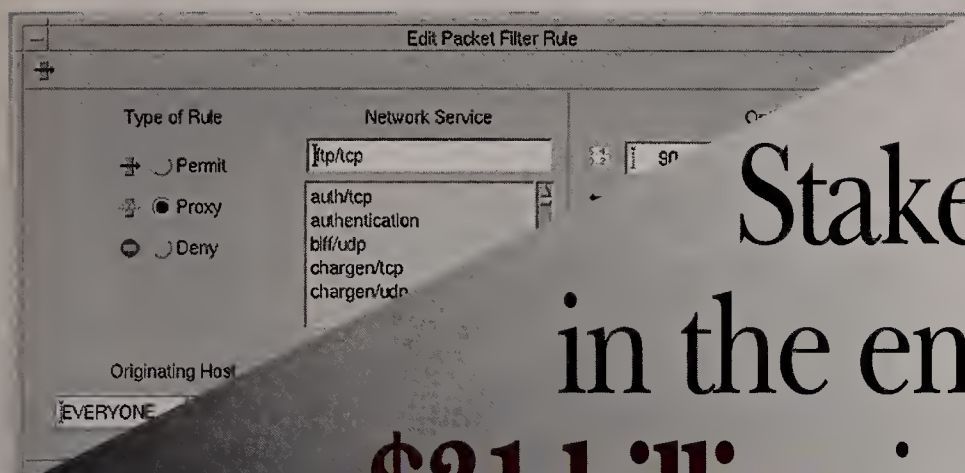
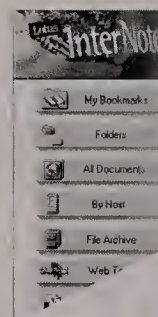
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June 10, 1996 Volume 1 Number 1



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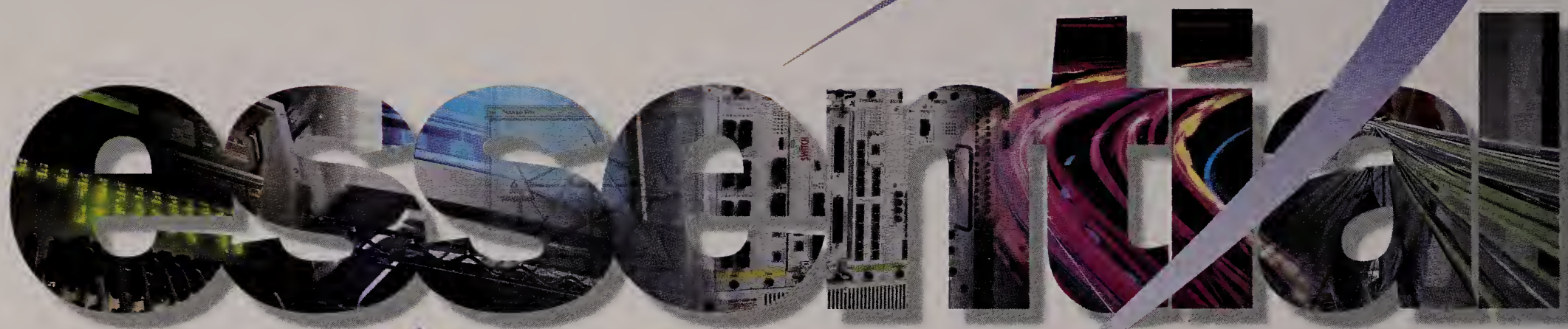
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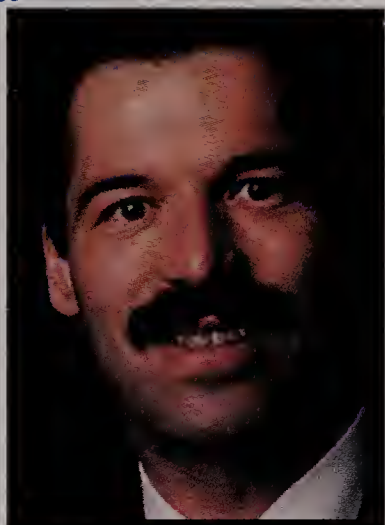
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